SCIENCE AND INDUSTRY

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Contractors and Engineers Monthly

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Highlights Of This Issue

- **Airport Construction**
  Two types of work involved in our vast program of airport construction and expansion are described in this issue: one is concerned with the asphaltic paving of tie-down aprons at an Army training field in the southwest; the other describes the dirt and rock moving and grading required to convert a large dairy farm into a 500-acre airport.
  See pages 1 and 26.

- **For Equipment Distributors**
  Because of the Annual Meeting of the Associated Equipment Distributors in Chicago this month, this issue contains three articles of particular interest to them.
  See pages 1, 7 and 50.

- **Highway Maintenance**
  The big job facing highway departments in the months to come is that of highway maintenance. Some hints on solving various maintenance problems will be found in articles in this issue which include a description of the new wartime wood-deck and unreinforced-concrete culverts designed by the Arizona State Highway Department; the shops, organization and equipment used by District 10, New York State, to keep Long Island highways doing their duty; Missouri's use of the Mud-Jack to pump slurry under concrete pavements to prevent further cracking and increase their useful life; and snow removal and ice control in western Massachusetts.
  See pages 13, 18, 22 and 28.

- **To Keep 'Em Working**
  The importance of careful equipment maintenance cannot be stressed too often these days when present equipment must be made to last for the duration. A comprehensive article on the care of crawler tractors and other crawler-equipped units offers a number of suggestions for increasing the life of their parts and keeping 'em working for Victory.
  See page 20.

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STACKS

Roadside Development Awards 1941-1942

The Roadside Development Awards for 1941-42, made by CONTRACTORS AND ENGINEERS MONTHLY *to highway contractors for outstanding contributions to roadside development, are announced on page 10. This year three Section Awards and the National Award are being made, with two Honorable Mentions.*

Because of the war and the necessary curtailment of highway and roadside development work, our Roadside Development Awards will be suspended for the duration.

Sales Head Salutes Equipment Dealers

E. R. Galvin of LeTourneau Praises Equipment Distributors for Their Contribution to Victory Effort

✦ IN reply to our request to E. R. Galvin, Sales Manager, R. G. LeTourneau, Inc., for a statement about the part being played by equipment distributors in the Victory effort, Mr. Galvin has sent the following:

"As we in the construction machinery industry review the events of the year which has elapsed since the attack on Pearl Harbor, we can appreciate more than ever the indispensability of the distributor in time of war as we have learned to appreciate him during peace times.

"The suddenness of Uncle Sam's precipitation into war against the Axis found us seriously unprepared in many directions, the correction of which situation involved the movement of hundreds of millions of yards of earth and rock. Almost every available contractor

(*Concluded on page 23*)

New Tie-Down Aprons Paved with Asphalt On a Prepared Base

Three Aprons for Training Planes at Southwest Field Built Speedily; Wood Forms Used for Concrete Header

✦ THE plans for three new tie-down aprons for planes at a large southwestern air field, where thousands of cadets are undergoing their formation training, called for a stabilized gravel base with an asphalt top. The installation of a concrete header around each of the 500 x 1,100-foot aprons, with an 8-inch open-tile drain 1 foot inside the header around the entire apron and 1½-inch water lines every 200 feet for washing, preceded all work on the base except the stripping.

Base Preparation

The areas for the three tie-down aprons were first stripped of all soil containing organic material to a depth of 2 feet. This was done by a Caterpillar No. 42 elevating grader pulled by an Allis-Chalmers Model L tractor and loading into dump trucks. The subgrade was then thoroughly scarified to a depth of 6 inches, compacted by two sets of Servis sheepsfoot rollers, and bladed to a smooth surface by power graders.

The gravel for the base course was then hauled in from pits about 4½ miles from the air field by a fleet of eighteen 4-yard dump trucks loaded by draglines. The material was dumped in piles in rows the long dimension of the aprons and close together both ways. This procedure made it possible for the inspectors to note any deviation from the proper type of material and also placed the material in position for the power graders to cut it down and mix the adjacent piles at the same time to assure as thorough a mix as possible. Three Caterpillar No. 12 power graders were used for this operation, spreading the material in 5-inch lifts so that the larger stones could be worked out and hand-scalped as the blading progressed. The maximum-size stone permitted in the finished layers was 2½ inches screen size. The material was worked across areas about 25 feet wide and then windrowed, the area watered, and the material bladed back and forth across the section to work out the oversize stone and aid in the compaction. Four water trucks with tanks varying from 1,000 to 1,500-gallon capacity were used for the sprinkling of the surface. The blading continued until the sheepsfoot operation started, using the two sets of Servis rollers pulled by the Allis-Chalmers tractors. When these walked out of the layer, pneumatic-tire rolling was started, using a set of Bros rollers pulled by a John Deere farm tractor. The compacted gravel had a plasticity index of from 5 to 8.

The tie-downs were installed on 30-foot centers over the entire area of the aprons. These consisted of cylindrical blocks of concrete 12 inches in diameter and 30 inches high with the tie-down loops cast in the blocks. They were set so that the tops of the tie-downs were at the same elevation as the top of the asphalt.

The Header

The concrete header surrounding the entire apron area in each unit consisted of a 6 x 12 curb cast in place. The forms used consisted of 2 x 12-inch planks held in line on the outside by 2 x 4's driven into the ground in pairs every 10 feet. In between were simple and effective clamps made of pairs of 2 x 4's spaced exactly the width of the header plus the thickness of the two form boards and held together by scrap lumber. These were simply pressed down over the forms as the concrete was poured and prevented spreading. When the forms were to be stripped, the clamps were easily pulled off and used over again.

The concrete for the headers was mixed at the site of the pour by a CMC 3-bag mixer. The aggregates were weighed out in wheelbarrows, using a

(*Concluded on page 6*)

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MAKING PAVEMENTS LAST LONGER

C. & E. M. Photo

Slurry pumping is being used in Missouri to replace washed-out subgrade and prevent progressive cracking of the pavement slab. See page 22.

New "High" in Earth Dams

Anderson Ranch Dam in Idaho Has Many Outstanding Features

MSTW, Contractors, Used Timber from Site, Old Steel And Minimum of Manpower And Critical Materials

✦ UNDER orders from the War Production Board designed to halt all construction not absolutely necessary to the war effort, the work at the Bureau of Reclamation's project at Anderson Ranch Dam, located about 52 miles southeast of Boise, Idaho, has been shut down. Because of the interesting and economical methods used by the contractors for this project and the record of speed made in operations, we are publishing our series of articles on this project because we believe they will be of interest and help to contractors handling similar types of work needed for the Army or Navy.

Anderson Ranch Dam extends across a narrow canyon and is completely masked until one reaches the rim and starts down the 2½-mile grapevine road into the canyon of the South Fork of the Boise River. After sundown the 2 miles of canyon development, from the upstream borrow pits through the well-lighted dam site, the contractors' shop, office, bunk and commissary area, to the camp of the Bureau of Reclamation engineers, presented a fantastic sight. By day the dam site itself and the $1,000,000 belt-conveyor system stretching nearly 2 miles along the top of the canyon and through tunnels attracted the most attention.

For a $10,000,000 project, this contract to build the largest rolled earth-fill dam in the United States, exceeding even Mud Mountain which had so much publicity because of its "circus tent" construction, presented the minimum use of manpower and critical materials. Employment reached a peak of around 900 men in the winter of 1941-42 and the following spring when the plant installation was at its height and the diversion tunnel was being pushed to completion. Just prior to closing down, employment was reduced to 550 and was expected to go lower as the conveyor system for hauling earth 2 miles from the Dixie borrow area downstream began its service. The $1,000,000 conveyor was purchased largely from Coulee Dam so that no new steel was required and a minimum of new belting. Fully 95 per cent of the conveyor trestle is of wood cut on the site and sawed in the MSTW

C. & E. M. Photo
A versatile tractor with double-drum hoist and extra seat for the operator when using the hoist. Here it is ready to tow an electric welder back from a repair job.

mills on the job.

The spillway, trashrack structure and power house are the only structures requiring new steel and the former could have been left without the concrete facing, which requires pinning to the rock, until after the war, while the power house could have been delayed until such

(Continued on page 16)

Speed of Driving Diversion Tunnel and Penstock Saved A Year, Character of Rock Required Change in Design

(Photos on page 60)

✦ IN the original plan, the diversion and outlet tunnel for Anderson Ranch Dam in Idaho was all horizontal. After the tunnel driving started and while surface excavation was progressing on the inlet, it became evident that the rock structure in the inlet was inadequate to support the inlet structure. This resulted in a change of design embodying an inclined inlet for the penstock but retaining the horizontal section for diversion purposes only. It was the contractors' intention to complete both the horizontal section and the inclined section of the tunnel before diversion. However, the ground structure in the surface of the inclined tunnel was such that it was impossible to complete the entire program before diversion. As a result, only the horizontal section of tunnel was completed with merely preliminary work done on the inclined section.

After high water was no longer a problem, the completion of the inclined section of the outlet tunnel was carried

C. & E. M. Photo
Work on the inclined inlet to the diversion and outlet tunnel at Anderson Ranch Dam.

forward. A timber ramp was extended into the tunnel from the upper portal supported on timbers above the low water flow now discharging through the tunnel. This ramp was designed to carry light trucks which were used to "trap" out the remaining excavation which was carried forward on a "shrinkage stope" method.

Portable Pipe Plant Serves Ordnance Job

Contractor Installs Full Equipment to Produce Up to 900 Feet of 12 to 60-Inch Pipe in 14 Hours Operation

✦ WITH orders on his books for 52,220 feet of 18 to 60-inch reinforced-concrete pipe for a southwest Ordnance Depot, and 8,638 feet of 12 to 48-inch pipe for other nearby operations, the pipe contractor moved his portable pipe plant adjacent to the Depot and started casting. He began making pipe May 15, 1942, and had the full 60,858 feet cast on September 12, 1942, so that he was ready to move on. All of the pipe was cast in 4-foot lengths, with spigot ends, and was designed for drainage lines, except the 12-inch pipe which was for sewers.

Locating the plant at a point where the sand and stone could be trucked in easily and the finished product could be hauled out by trailers, the contractor selected a quiet spot somewhat distant from the bedlam of the Depot. He set up the complete plant and a trailer colony for his men so that they were well taken care of for the period spent out on this job. In fact, some of the smallest children on the job had a temporary play yard made from the reinforcing fabric used in the pipe, until it was required for official duties.

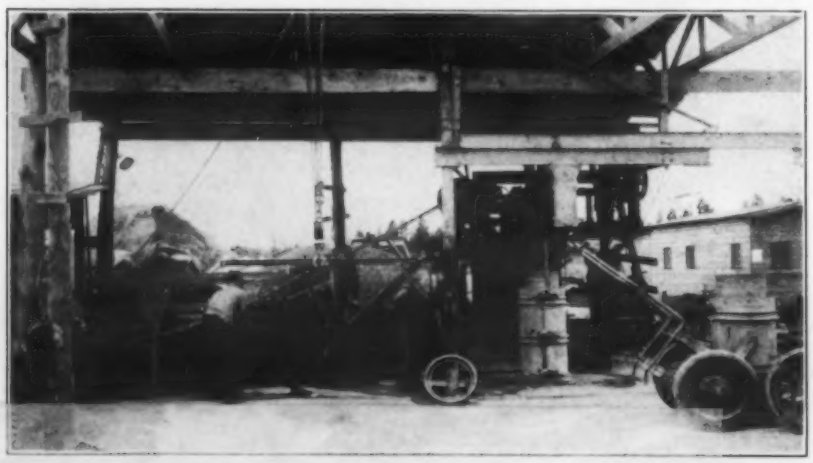
Preparing Cages and Forms

The fabric reinforcing for the pipe was purchased in rolls, cut to length and put through shaping rolls at the plant site to make the reinforcing the proper diameter for the pipe. The machine for shaping the fabric is adjustable so that it can turn out fabric cylinders of any desired diameter. The loose cylinders are then electrically-welded to make them a solid basket. For the pipe up

(Concluded on page 55)

A complete Quinn concrete-pipe manufacturing plant at a Southwest Ordnance Depot, showing the assembly of a form around a cage and base at the left and, at the right, the buggy for moving a form with the core already inserted.

C. & E. M. Photos



Hints For Patching During Cold Weather

With wartime traffic increasing in intensity and weight on many sections of our highways this winter, there is need to consider the ways of placing temporary patches during cold weather to prevent further damage to pavements by the extension of the pot holes or other breaks between now and warm weather when a more permanent patch can be placed.

When patching in temperatures between 10 and 45 degrees F., the surface of the pavement should be dried by an oil torch and a heated patching material should be used. This must be laid at once before the heat of the batch is lost or it will not tamp and roll well and will break up rapidly under heavy cold-weather traffic. A hot-mix is the best for patching where there is heavy traffic, but if there is a delay in placing due to the length of haul or for other reasons it is far better to use a cold-mix material for the winter season and replace when the weather becomes warm.

Pavements must be maintained during hot or cold weather more intensely than ever before because of the reduced volume of bituminous materials available for resurfacing and reconstruction.

Two views of Watt Street, Youngstown, Ohio, which is paved with TEXACO Asphalt. Note blast furnace stacks in background.

Speeding the flow of Defense Workers to jobs in vital war industries

America's army of workers, who turn out vital materials and weapons needed for victory, must have fast, dependable transportation to and from their jobs.

Easy-riding, skidproof TEXACO Asphalt pavements are playing an important part in meeting that need. In the above photographs, for example, note the stacks of blast furnaces in Youngstown, Ohio, and the smooth, resilient TEXACO Asphalt pavement which serves workers employed in this essential industry.

Throughout the country east of the Rockies, other TEXACO-paved streets, as well as TEXACO-paved highways, provide speedy, dependable access to war industries, air bases and other centers essential to our war effort.

THE TEXAS COMPANY, *Asphalt Sales Dept.*, 135 East 42nd St., New York City

Boston Philadelphia Richmond Chicago Jacksonville Houston

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Highway Offices Stripped! Who Will Do the Planning?

Already we realize the need to plan for post-war highway construction. We know it to be the one type of work that absorbs the largest amount of man-power, from engineer to laborer, and machine tool maker to equipment operator. Its end result is the provision and extension of a service and recreational facility of inestimable value.

The complaint comes from highway department offices, "We have lost our personnel, we are badly handicapped, from survey party to design office and drafting room." Perhaps we may find the answer to this situation in a truly Yankee manner, through another question. At the recent quarterly meeting of the American Society of Civil Engineers, some discussion was devoted to the fact that soon thousands of older engineers ineligible for military service will be released from the design and construction of the great camps and bases for training our armed forces and the industrial plants which are to supply their needs. As the war construction program is gradually completed, more and more of these engineers will be available for service elsewhere. Why not make provision to absorb some of this vanguard of trained engineers in the vast task of planning the nation's network of post-war highways?

Many highway departments are in a difficult financial position right now, in spite of the depletion of their personnel and the attendant decrease in their payrolls. However, those who can afford additional expenditures should make every effort to add to their design personnel from this body of trained men.

Where funds are not available from state highway department budgets, Congressional action should make possible recourse to the $175,638,816 of unobligated balances of regular Federal-Aid, secondary and feeder road funds, and those set up under Federal-Aid for grade-crossing elimination. These run from a minimum of $514,212 in Vermont, to $12,555,953 in Texas, all sums which might well be expended to excellent purpose in absorbing qualified engineers to do the field work and design for our highways of post-war days.

There have been suggestions that excess funds be invested in War Bonds so that right-of-way could be purchased when needed, or that these funds be used now to buy the right-of-way which might be more expensive in the post-war period than it is today. Any purchase of right-of-way must be predicated on a complete design, and that plan must be prepared *now* for future construction.

Death Comes at Night

Reports from motor vehicle commissioners and state police officials read during the annual meeting of the National Electrical Manufacturers' Association reveal that the decline in daylight traffic deaths is not accompanied by a similar decrease in night fatalities. In New York State, for example, July night fatalities rose 19 per cent, while daytime deaths decreased 28 per cent.

A. F. Dickerson, Chairman of the Street & Highway Lighting Safety Bureau, stated, "What at first seems a gratifying result of our safety efforts resolves itself after closer inspection into a reduction in daytime accidents that are merely proportionate to the lowered volume of (daytime) traffic. This is not usually true of night fatal accidents, however. In most localities their decline is not keeping pace with the daytime decrease . . . Crowded road conditions around our war production centers have also posed a new and increasingly difficult problem. In Michigan, for example, 50 per cent of the drivers involved in traffic accidents are factory workers. Over one hundred service men are hurt or killed on California's roads each month. Three out of five persons killed by automobiles in Texas for the first half of this year were members of our armed forces."

This situation needs a careful analysis to prevent hasty expenditures that may not be warranted. None of the reports bring out the greatly increased *night* traffic at war production centers, air bases and arsenals, where work continues three shifts every 24 hours, with hordes of pedestrians, civilian and military, released at every change of shift, night as well as day. Thousands of automobiles also crowd the roadways near these active centers at each change of shift.

It is known that adequate highway lighting will reduce accidents, but sidewalks will also keep the pedestrian where the automobile is less likely to get him. Few of the access roads we have seen close to plants not actually located within cities have been provided with sidewalks. Every phase of protection must be examined and the most economical combination using the smallest amount of critical materials for the greatest safety of all should be adopted.

Get in the scrap! Steel production for the Victory effort can not be maintained at the necessary peak unless every bit of idle scrap is turned in. Half the metal in every ship, every tank, every gun is scrap. Look through your shops and yards again. Get together all your scrap and start it on its way to Berlin and Tokyo now!

Special Report Filed On Indiana Highways

The State Highway Commission of Indiana has recently prepared a special report on the state highway system to be filed with the Governor for transmittal to members of the Eighty-Third Indiana General Assembly. This is in accordance with an enactment of the General Assembly during the 1941 legislative session.

Information for this report was prepared by the engineering staff of the Commission and represents an extensive program of modernizing roads and bridges to meet both present and future traffic demands, Mr. Hadden said. An important phase of this improvement program will be the modernization of roads to meet new traffic conditions which are resulting from war conditions and the establishment of defense or war areas which will be maintained and operated after the war.

For several years the Highway Commission has had surveys in progress to determine what improvement and modernization work was necessary to meet traffic needs and has also extended its study of traffic flow on the highways to provide additional information on the subject. In cooperation with the Public Roads Administration, the Commission completed just a year ago a survey of all railroad grade crossings on city streets and county roads which were not a part of the state highway system, to determine what should be done to correct safety hazards and meet present-day traffic conditions.

Funds for Two Years Road Repair on Hand

The National Highway Users Conference has released a statement, "Despite declining highway revenues resulting from the rubber shortage and gasoline rationing, ample funds probably will be available for road maintenance during the next two years, according to a study by Dr. Richard H. Rush of the Department of Commerce. Due to material and labor shortages, new construction is expected to be held to minimum needs.

Shortage of labor and materials, increased commercial use of highways, and increased maintenance needs as irreplaceable roads reach the end of their normal lives are among the major wartime maintenance problems listed by Dr. Rush.

The study of the Department of Commerce recommends:

1. Early preventive maintenance.
2. The possibility of maintenance work by the Army in acute labor shortages.
3. Use of tanks and other heavy military equipment on the highways to be kept to a minimum at Army discretion.
4. Re-routing of traffic to equalize road wear.
5. Maintenance requiring large amounts of material or labor be deferred until the end of the war if possible without interfering with essential highway transportation.

From our observations, the state highway departments, as well as county organizations, are a good jump ahead of Dr. Rush's report, for they are carrying on maintenance, preventive and permanent, early and late. There is great doubt in our mind, however, that the Army will ever turn over any labor to maintain highways in this country. They are training men to fight and to perform road work outside of the United States, and it will be entirely up to our own depleted maintenance organizations to carry on here.

As for keeping tanks and heavy military equipment off the highways as much as possible, the Army has seen to this by reducing its "over-the-road" haulage to a minimum and that chiefly in maneuvers. Tanks wear out altogether too

"Watch it, fellah! Wet concrete!"

quickly to run them any considerable distances over our highways. Shipment by rail is the answer for tank transportation.

Maxwell Halsey, Executive Secretary, Michigan State Safety Commission, reported at the Michigan Highway Conference, very early in 1942, several ways in which highways could be made to serve better, and among them was "redistributing traffic over less traveled highways and streets to relieve congestion" (C. & E.M. May, 1942, page 4).

Point 5 is worthy of a formal debate. If a highway is carrying such intensive war traffic that its maintenance requires the expenditure of a considerable sum of money and considerable labor, it is essential that the work be done immediately in order to conserve tires and equipment and to keep war traffic moving. Of course, Dr. Rush softens the blow of deferment by saying, "if possible without interfering with essential highway transportation".

Maintenance materials are exceedingly difficult to purchase and labor almost impossible to hold within a maintenance organization. State highway departments in general feel that there will be no question of "wasting money" on non-essential road work, because materials and labor are just not available for more than the absolute minimum of maintenance necessary to keep our roads in a safe condition until such time as an extensive reconstruction program is possible.

New Bibliography On Flight Strips

A selected annotated bibliography on Flight Strips and their development from 1935 to 1942 has been prepared by the Army Air Forces Library, Washington, D.C. Copies of this complete 15-page bibliography may be obtained by addressing the Army Air Forces Library, Headquarters Army Air Forces, Washington, D.C.

Courtesy Mandel Engraving Co. and Art Studios, Inc. Milwaukee, Wis.

Five Rubber Companies Will Operate New Plant

Announcement has been made that the Rubber Reserve Co. has made a contract with the new National Synthetic Rubber Corp. for the operation of a new government-owned synthetic rubber plant to be built in Kentucky by the Defense Plant Corp. The plant's output will be made generally available and allocated by the Government, together with the products of other government-owned synthetic rubber plants.

Formed for the specific purpose of operating this new plant, The National Synthetic Rubber Corp. is jointly owned by five long-established rubber companies, including Goodall Rubber, Inc., and the Hamilton Rubber Mfg. Co., of Trenton, N. J., Hewitt Rubber Corp., Buffalo, N. Y., Lee Rubber & Tire Corp., Conshohocken, Pa., and Minnesota Mining & Mfg. Co., St. Paul, Minn.

W. W. Benner of Lee Rubber & Tire Corp. is President of the National Synthetic Rubber Corp.; Dr. B. J. Oakes of Minnesota Mining & Mfg. Co. is Executive Vice President and General Manager in charge of operations at the plant; William M. Collins, Jr., also of Minnesota Mining & Mfg. Co., will be Vice President and Treasurer; and B. J. Moffatt of Hewitt Rubber Corp., Vice President.

To insure a sound peacetime economy, "In time of war prepare for peace."—M. J. Hofman, Commissioner of Highways, Minnesota.

Caterpillar Carries On

This is the title of a new 8-page booklet in color, recently published by the Caterpillar Tractor Co., Peoria, Ill., carrying a message of what Caterpillar and its dealers are doing to "keep 'em working" and to prevent the "orphaning" of tractors in spite of wartime pressure.

Copies of this interesting booklet, Form 7707, may be secured by those interested direct from Caterpillar.

WE MUST KEEP 'EM *Landing!*

KEEP BUILDING ARMY AND NAVY AIR BASES WITH PLANT MIXED ASPHALT

IT IS THE DUTY OF EVERY PATRIOTIC AMERICAN TO CONSERVE CRITICAL MATERIALS

Write for

D. B. ("DEACON") JONES' PAMPHLET ON CARE OF SIMPLICITY ASPHALT PLANTS

THE SIMPLICITY SYSTEM COMPANY

CHATTANOOGA, TENNESSEE

Asphaltic Pavement For Tie-Down Aprons

(*Continued from page 1*)

Fairbanks wheelbarrow scale, and the water for the mixer was taken from a supply tank by a small CMC self-priming centrifugal pump. The mixed concrete was moved and delivered to the forms by a pair of Insley pneumatic-tired concrete buggies. After the forms were stripped, the concrete was immediately sprayed with Hunt Process curing compound to hold in the water and permit a uniform cure throughout the concrete.

The Asphalt Surface

The 2-inch asphalt surface of the aprons laid on top of the prepared base came flush with the top of the headers. The surface material was either a cold-mixed limestone rock asphalt which was used on some areas or a cold-mixed cut-back asphaltic concrete used on other areas. Both materials were procured, mixed and ready to place, from commerical plants. The cold mix was dumped from the hauling trucks and bladed by the Caterpillar No. 12 power graders and given a finish rolling by a 10-ton tandem steel-wheel roller.

The cold mix was sealed with 0.15 gallon per square yard of a very soft asphalt, OA-230, and then covered with 1 cubic yard of ⅜-inch and smaller limestone chips at the rate of 1 cubic yard per 150 square yards and rolled by a 5-ton roller.

Roadways

The roadways at the air field were included in the same operations as the aprons. They were graded 22 feet wide with a 6-foot berm on either side, and the gravel spread 34 feet wide and feathered at the edges. A slope 6 feet long on 8 to 1 down to a V-ditch provided for drainage. The backslope is 5 feet. These dimensions were varied in some roads because of the utilities and the tardy installations of pole lines, etc.

Personnel

This work was done by contract under the direction of the U. S. Engineer Department. In the interest of national security, the location of and mention of personnel connected with U. S. Army construction are omitted.

C. & E. M. Photos

Oversize stone in the gravel for the base for tie-down aprons at a southwestern air field was worked out by blading with power graders. Upper left, a Caterpillar No. 12 working on a section already compacted by sheepsfoot rollers. Above, an Allis-Chalmers Model L tractor and Gar Wood scraper at work on apron excavation. Left, one of the four water trucks used for sprinkling the gravel for the stabilized base for the aprons.

Nebraska Road Work For 2 Years Outlined

In a statement in the Nebraska Good Roads Association Bulletin, Wardner G. Scott, State Engineer, points out that at the beginning of the next biennium, Nebraska will have available approximately $5,000,000 of Federal funds, now authorized and appropriated to Nebraska, for the construction of highways forming a part of the Federal primary or secondary systems.

Certain of these funds will be used on projects now approved but held in abeyance, pending the availability of men and materials. Other projects on which surveys have been made and on which plans are now being prepared, are very likely to be approved for construction from time to time, Mr. Scott stated. The approval of a highway project at the present time, of course, depends entirely upon its relation to the war and only those projects absolutely necessary to winning the war are being approved for immediate construction.

Projects on the strategic network are financed 75 per cent by Federal funds and 25 per cent by the state, in accordance with the Federal Road Bill of 1941, and it is expected that some work on the strategic network in Nebraska will be approved. There will also be projects connected with the war although not located on the strategic network which must be built to serve war industries. These projects will require participation by the state in an amount of 50 per cent of the cost.

State revenues for the biennium beginning July 1, 1943, and ending June 30, 1945, will fall approximately $5,000,000 below revenues of the previous two-year period, it is estimated.

As a result of the curtailment of the road program in 1942, due to the war, certain functions of the Department have been curtailed. It is believed advisable, however, to continue sufficient engineering personnel to study projects which will be needed immediately after the war and to have those plans prepared and approved by the Federal authorities so that there will be no delay when the war is over.

Maintenance is now and will be the major requirement of the Department and will call for an expenditure during the next two years of approximately $3,000,000 a year. Mr. Scott states that it is sound from a business standpoint and from an economic standpoint that present allocations of state revenues be maintained in order to safeguard Nebraska's present system of highways and to insure 100 per cent cooperation of the state in winning the war.

To Prolong Rope

MAKERS STRESS LUBRICATION

WIRE ROPE manufacturers, without exception, stress lubrication as the No. 1 war measure to lengthen rope life, save steel, maintain vital construction schedules. Everywhere, wire rope users are following this advice, and prolonging rope life with *Texaco Crater.*

Texaco Crater penetrates to the very core of wire rope, sealing each wire in a tough, viscous film that reduces internal friction and wear, keeps out moisture, prevents corrosion, makes ropes last longer.

The outstanding performance that has made Texaco preferred in the fields listed in the panel has made it preferred on important construction jobs throughout the country.

These Texaco users enjoy many benefits that can also be yours. A Texaco Lubrication Engineer will gladly cooperate in the selection of the most suitable lubricants for your equipment . . . just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write: The Texas Company, 135 East 42nd Street, New York, N.Y.

THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

CRATER BOOKLET yours for the asking. 32 pages telling and showing what *Crater* does and how easy it is to use to protect wire rope, gears and chains.

TUNE IN FRED. ALLEN EVERY SUNDAY NIGHT—CBS.

TEXACO

TEXACO

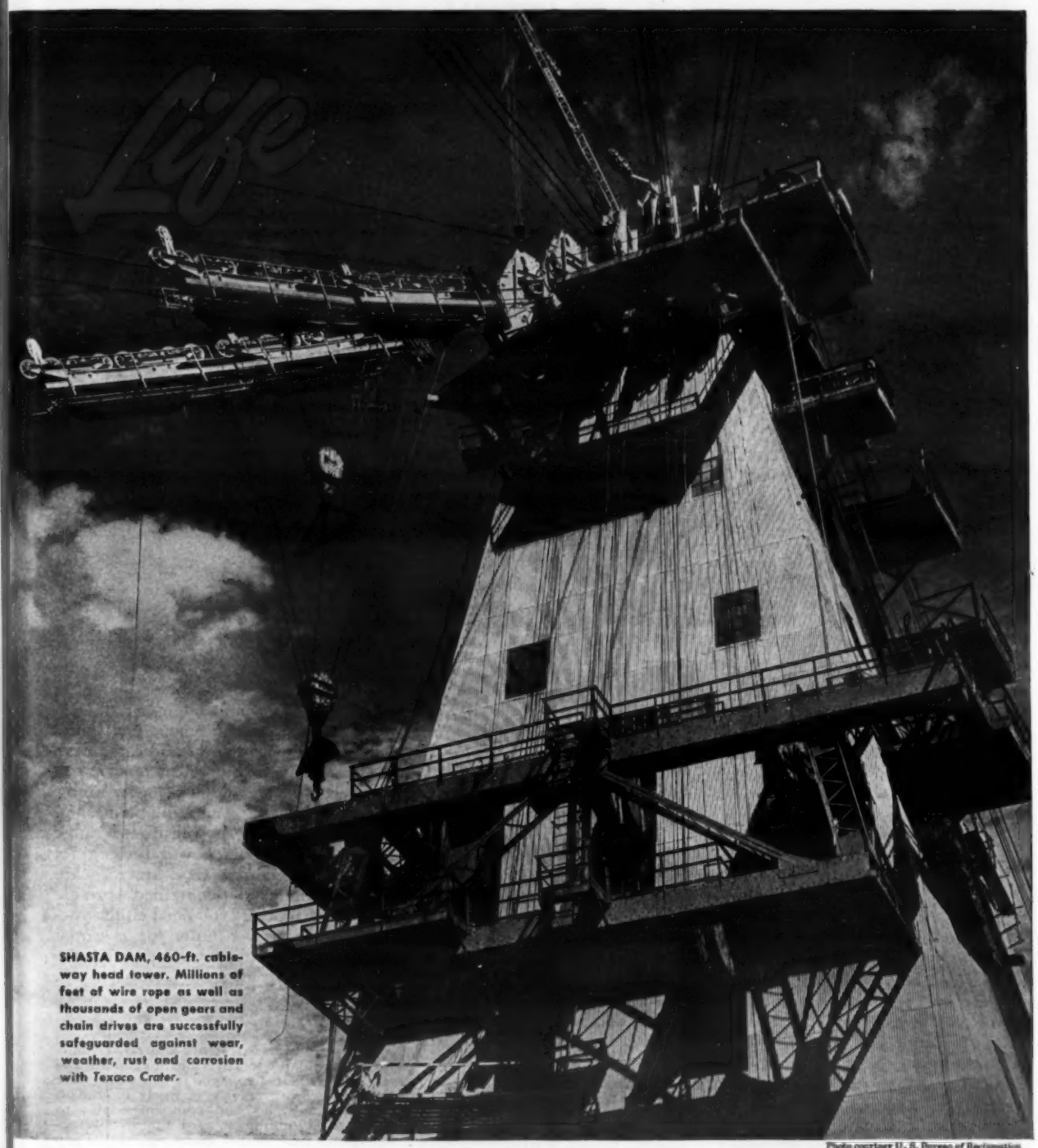
Welding Cuts Costs Of Caisson Building

The Navy dry dock depicted in the accompanying photo is equipped with an all-arc-welded caisson which was redesigned from riveted construction. It was described in a paper for which the authors, Captain C. A. Trexel (CEC) U.S.N. and A. Amirikian, Director of Planning and Design and Design Engineer, respectively, Bureau of Yards & Docks, Navy Department, Washington, D. C., received the Grand Award of $13,700 in the 2½-year $200,000 welding study program sponsored by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio. Designs were prepared for two large caissons of riveted construction. It was then decided to prepare alternate designs of all-welded construction. These were submitted for bids and eight contractors participated in the bidding.

The low bid for the two caissons for the welded design was $108,030 less than that for the riveted design, amounting to 25 per cent in cost. As a result, the Navy Department has let a number of other contracts for similar welded structures. The net savings for caissons built and under contract is $1,652,000. The savings on projected construction in the immediate future will be $3,540,000. Savings in weight of projects built is 4,200 tons and in caissons projected, 9,000 tons.

A Naval dry dock equipped with an all-welded caisson for which the designers received the Grand Award of the Lincoln Arc Welding Foundation.

The Foundation was created in 1936 in honor of James F. Lincoln, President of The Lincoln Electric Co., Cleveland, by the company's Board of Directors.



SHASTA DAM, 460-ft. cableway head tower. Millions of feet of wire rope as well as thousands of open gears and chain drives are successfully safeguarded against wear, weather, rust and corrosion with *Texaco Crater*.

Photo courtesy U. S. Bureau of Reclamation

HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Service Charges Limited By OPA

Equipment Distributors Affected in Various Ways By the $2-Ceiling Rate

✦ THE OPA $2.00-an-hour ceiling rate for the servicing of construction machinery by equipment distributors has caused considerable consternation and some criticism by those caught with a low service rate. The greatly changed position of the equipment distributor in the industry makes necessary a careful study of the effect of this ceiling rate.

When the market for construction equipment was free and open, the equipment distributor was salesman, manufacturers' representative, financial agent, engineering counsellor to the purchaser, and provided much of the service necessary to the efficient operation of the equipment. Today, with sales restricted to those constructing projects for the Armed Forces, the Defense Plant Corp., the Maritime Commission, etc., the distributor must rely on the income from his service department to maintain his dwindling organization. This service is of the utmost importance because "construction must carry on" to insure the training centers and bases for our troops, the air fields for training and our defense, and the equipment for the production of raw materials and manufactured products to prosecute the war to a satisfactory conclusion.

Our fine army of equipment distributors is now arrayed in four divisions as a result of the OPA edict, with a few distributors coming under more than one classification.

No Repair Service

In our survey of a large group of outstanding distributor organizations throughout the United States, we found that there is a considerable number who do not operate a shop for servicing equipment and consequently are not affected by this ruling. To continue in business, these distributors are still relying on the sale of parts and such new equipment as they can secure for high-priority customers working solely on military projects.

Service at Cost—or Less

There is a very large group of distributors who have been caught in a very uncomfortable position by the $2.00 ceiling. For many of them, the overhauling of construction equipment was merely an adjunct to the regular business and was a means of furthering the sale or rental of used equipment acquired in trade on the sale of new machinery. As such, the Service Department was considered a necessary evil, rather than a profit maker. Similarly, in other cases, the servicing of machines for customers was regarded more in the light of an accommodation to further the sale of new equipment and to maintain goodwill, so that the rates charged were far below those which would have been charged had the distributor been dependent upon this department for survival.

With the sale of new machinery and used machinery practically terminated, at least in sufficient volume to permit a distributor to carry on, the rebuilding and service department must stand on its own feet. Costs must be kept carefully and rates charged commensurate with the value and cost of such work. With the ceiling frozen at $2.00 an hour, many distributors are losing money on every shop job they take, if the proper charge is made to carry the overhead on the shop. Some distributors are having

(*Concluded on page* 53)

C. & E. M. Photo
A Cedar Rapids crushing and screening plant preparing road surfacing material for an Ordnance Depot.

Gravel Base Courses For Ordnance Roads

(*Photo on page 60*)

Within the first 76 calendar days of operation of a contract on a large mountain-state Ordnance Depot, the contractor completed 65 per cent of the grading, but delay in setting up the gravel plants had retarded placing the gravel on the roads. The contract called for 1,800,000 cubic yards of excavation and placing 1,000,000 cubic yards of gravel in the road as pit-run fill and base and crushed surfacing.

The grading of the roadway areas to proper elevation and contour was done by a fleet of Caterpillar tractors and bulldozers and six Tournapulls, with graders smoothing the surfaces after they had been built up by the Tournapulls.

The gravel for the road base was loaded direct from the pits by a ⅜-yard Bucyrus-Erie power shovel to a fleet of seven trucks which hauled to the road where the gravel was spread by graders.

For the road surfacing, the pit-run material was loaded into the trucks and delivered to stockpiles at four Cedar Rapids crushing and screening plants having 10 x 36 jaw crushers and 18 x 30 rolls. The material was fed to the crushing plants from the stockpile by a RD8 with a bulldozer. The plants were powered by Caterpillar D13,000 diesel engines.

The pit-run gravel at the site of this Ordnance Depot varies from pea gravel up so that the location of the various crushing plants as well as the choice of pit-run material was merely a selection of site for the operation. The maximum rock ran from 2 to 3 inches but throughout all locations sand was in excess.

Which bonds will you have—the bonds of defeat and slavery, or War Bonds and Victory?

Rust-Proof Paints Simulate Aluminum

Two products of the Rust-Oleum Paint Corp., 2425 Oakton St., Evanston, Ill., are particularly designed as a satisfactory alternative for the aluminum paint which is no longer available. These paints are listed in the new Rust-Oleum catalog as No. 18328 Silver Gray and No. 906 Fume-Proof Silver Gray.

The first is manufactured strictly for out-of-door use and for some interior uses on metal, concrete, brick and wood. It gives a high gloss finish and dries in 6 to 8 hours, it is reported. Where positive protection against rust and weathering plus the appearance of aluminum is desired on bridge structures, highway signs, fence and guard rails and posts, tanks, and similar uses, it is stated that this paint gives unusual satisfaction.

The No. 906 Fume-Proof Silver Gray is designed for use in industrial areas where smoke, brine, dampness or fume conditions are severe. It may be used on structural steel, fences, machinery, signs, tanks and structures. It withstands 450 F. and all weather conditions.

In order to assure a correct application of these coatings, the Rust-Oleum company is providing a consulting service for the analysis of special rust-prevention problems.

Pictorial Catalog on Bituminous Distributors

In a 32-page booklet called Foto-Facts, the various features of the Etnyre Black Topper bituminous distributor are described and illustrated. Among these features are the patented No-Drip spray bar, the Vacu-Flo cleaning system, slotted, non-clogging nozzles, a choice of three types of engines, and highly accurate registering devices.

Copies of this Foto-Facts, Catalog No. 510, may be secured by interested contractors and Federal, state, county and town engineers direct from E. D. Etnyre & Co., Oregon, Ill., by mentioning this item.

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PROPER CONCRETE
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Write us for
information on other
Papers meeting
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particularly UUP-536

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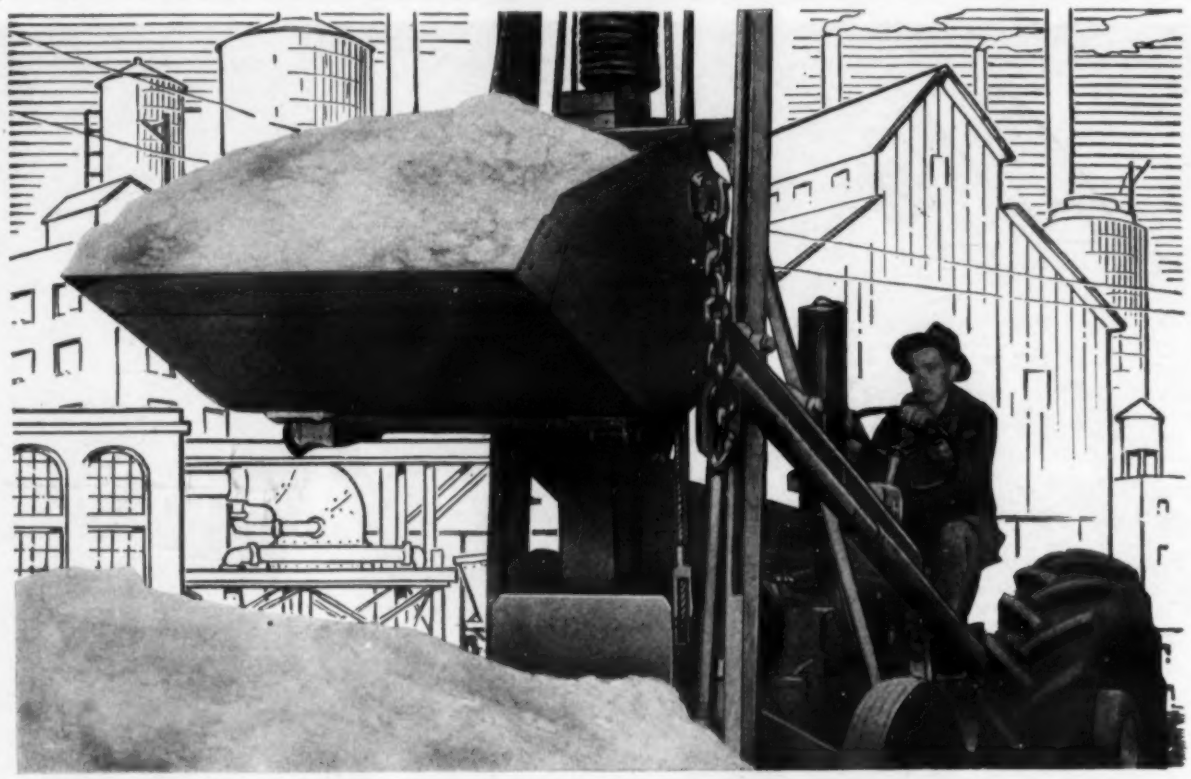

Beat Schedule from Bin to Battle

It betrays no military secret to tell you that this Case-powered loader, shown here with surroundings suppressed, is handling a chemical material. Working in a huge storage bin, it scrapes up a giant-size shovelful from the floor, carries it 50 feet or more and dumps it into a conveyor. From 250 to 300 cubic yards are handled daily, with one operator and no hand work.

Such an outfit swings instantly into the swift stride of war-time work. No manpower problem; controls are so simple and easy that operation by women is practical. No waiting for receipt and installation of elaborate cranes or conveyors. No delays due to clogging of caked materials. Minimum metal exposed to corrosive materials. Maneuverability to get things done in cramped spaces. Mobility to jump from job to job. Versatility for wide variety of materials. And, of course, handy pulling power always available, with or without removal of bucket.

Back of these obvious advantages are the strength and stamina which have become a hundred-year habit in Case construction. The strength of Case industrial tractors, plus their stability, enables them to stand up under the added burdens of loaders, cranes, sweepers, plows, and other mounted equipment. Their stamina, which combines eager power with extra endurance, enables them to get things done and see things through.

In the hands of contractors, Case tractors hustle the construction of access roads to new war plants, camps, bases. With snow plows of diverse types they keep roads open, sidewalks clean, work areas clear. With varied equipment they build air-fields, load ships and cars, move materials in shipyards.

For driving mills of many kinds, pumping and generating plants, and indeed any belt power job in a range of 40 to 60 horsepower, the engines of these sturdy Case tractors are available as self-contained portable power units. If you need either tractors or power units for essential work, call your Case industrial distributor or write the factory.

★ ★ ★

Case industrial tractors and power units are available to government agencies and private plants engaged in war work. Case engineering service is freely offered to such agencies and companies; also to others looking toward future developments that involve tractor power. If you have such power applications in mind, you are invited to get in touch with us. J. I. Case Co., Racine, Wis.

CASE ★ ★ ★ ★

JOB-PROVED *Power* SEES THINGS THROUGH

Careful Accounting And Careful Repairs

Running a Considerable Amount of Heavy Equipment Makes Constant Calls on County Shop and Parts Stock

(*Photo on page 60*)

✦ PULASKI COUNTY, Arkansas, where the state capital is located, justly prides itself on the simplicity of its accounting system which shows every day the location and operating costs of every piece of equipment. Spread over 811 square miles, it is the wealthiest and most densely populated of the seventy-five counties in the state. Outside of cities, towns, highway rights-of-way and public lands, approximately 73 per cent of the county is in forest lands, brush and waste. A considerable portion of the brush and waste lands have only recently been taken over by the Army for reservations for various war activities.

The 1941 report of the Pulaski County Planning Board points out that war activities have created a number of serious problems, especially in the areas where munitions plants have been built. Greater Little Rock had its first part in the present national emergency in December, 1939, when over 30,000 acres of land adjacent to Camp Robinson were leased for winter training quarters for 1,000 regular troops. When Camp Robinson was designated a National Guard Camp a year later, 25,000 troops moved in.

In June, 1941, locations for an Ordnance Plant and an Ordnance Works were selected in the county. About 4,500 persons are now working on construction of the plant and between 1,600 and 1,800 are employed at the Ordnance Works. These, together with the completed Camp Robinson, have caused a considerable population increase in Pulaski County and have brought about changed conditions. The expansion of the bauxite industry to supply the increased demands for aluminum have brought many highway maintenance problems to the county, as some of the mines have been hauling as high as 13,500 pounds per load in 1½-ton trucks and one was weighed at 20,000 pounds. This has brought about the destruction of sections of highway and made it necessary to place restrictions on the loads that may be hauled over some of the roads in order to prevent a total loss of the investment in the highways, to say nothing of the destruction that would be wrought to highly valuable hauling units by a continuance of this outrageous over-loading.

The Camp Robinson area and its extension closed two primary county highways and the Ordnance Plant and the Ordnance Works closed one primary highway each. Altogether, these areas have closed more than 64 miles of county roads, which created a need for new traffic ways around the areas to care for disrupted mail service and school-bus routes, as well as the regular travel of citizens of the community.

Traffic has increased more than 35 per cent due to war activity and at critical points it amounts to many times this figure.

Financing

There are 890 miles of highways and roads in the county, omitting the 64 miles closed by war plants and operations. Of these 890 miles, 154.48 are on the state highway system and 735.52 are on the county system for which the County Highway Department is responsible. The total expenditures for highway purposes in Pulaski County from April 1, 1917, to December 31, 1937, was $42,643,188. The revenue for county road work was $113,084 in 1938, $147,367 in 1939. The revenue in 1940 was $176,309.76 plus $14,800.25 balance from the 1939 Road Fund. The amount of revenue in 1941 was $186,373.89 plus the balance of $7,304.67 from the 1940 Road Fund. This revenue was derived principally from the 3-mill tax, a per capita road tax, and the county's share of the state gasoline and severance taxes. All county road construction is financed from current revenues. The county's share of the "turnback fund" from the state gasoline tax is applied to retiring indebtedness of several local road and street improvement districts.

(*Continued on page 56*)

C. & E. M. Photo

A D7 tractor and a 5-yard LaPlant-Choate hydraulic scraper, part of the county grading outfit, working on the Faulkner Lake Road, Pulaski County, Ark.

The Original BucketruX

Trade DEMPSTER DUMPSTER Mark

Reg. No. 353486

Mfgd. by

DEMPSTER BROTHERS, Inc.

Knoxville, Tenn.

"Take care of yourself, Dad"

Last year over 180 *million* man-*days* of productive time were lost through industrial accidents—many of them needless. Think how many tanks, ships, guns, planes those 180,000,000 man-days of work would have made! . . . Yes, dad—take care of yourself. Your soldier-son needs your factory production to win.

American Cable TRU-LAY PREFORMED WIRE ROPE is helping keep down accidents every day because it is a safer rope to use and handle. TRU-LAY PREFORMED resists kinking and snarling. It resists whipping; spools better. Worn, broken and chisel-sharp crown wires refuse to wicker out to jab workmen's hands. They remain in place, making TRU-LAY *much* safer to handle.

Use American Cable TRU-LAY PREFORMED for your next rope. Do everything possible to reduce lost-time accidents. America needs your full-time production.

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ESSENTIAL PRODUCTS... AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses... *In Business for Your Safety*

Roadside Development 1941-42 Award Winners

Middle West Roads Co. Of Indianapolis Takes Top Honors; Two Other Section Awards Made

✦ In spite of the curtailment of highway construction activities because of the war, a considerable number of very interesting nominations were made for our 1941-42 Roadside Development Awards for highway contractors making outstanding contributions to roadside development on their highway contracts during the past two years.

Winner of the Central Section and the National Awards is the Middle West Roads Co. of Indianapolis, Ind., for its highway grading and roadside-development contract on Route U. S. 50 in Hamilton County, Ohio, for the Ohio Department of Highways. This contractor was nominated for the excellence of his work, unusual cooperation with the State Highway Department engineers, and the development of equipment and devices which contributed to the quality of the work and its economical prosecution. The nomination was made by Dallas D. Dupre, Jr., Landscape Architect, and Herbert F. Yaekle, Division Landscape Architect, Ohio Department of Highways. The project was 3.11 miles long and the contract price $449,729.62.

In citing the Middle West Roads Co. for the National Award, the judges mentioned particularly the contractor's obvious desire to do a better-than-required job; the use of a special screen for the topsoil to provide a better quality seed bed than required; the grading of stones thus secured for use in tree aeration to preserve a number of trees on the job, which was done without reimbursement; the construction of a number of small stone gulleys to aid in erosion control; and particular care of the trees along the highway, thus creating good will between the Department of Highways and the adjacent property owners. In addition, the use of special equipment in the seeding operations and the development of an ingenious device for handling the bales of straw for mulching contributed greatly to the early germination of the seed and resulted in a reduction of the cost of handling the straw bales.

Sodding on this job was subcontracted to the Kroeger Sod Co. of Cincinnati, Ohio, which, with Mr. Joseph Kroeger in charge, carried out its share of the work with the same high quality of workmanship and economy of operation as characterized the work of the Middle West Roads Co.

Southern Section Award

The Southern Section Award goes to Baker Brothers Co. of Fort Worth, Texas, for its work on a 19.957-mile roadside-development contract on U. S. 81 in Comal County, Texas. The nomination by Jac L. Gubbels, Head, Roadside Development, and Melvin M. Rotsch, Senior Roadside Developer, District 15, Texas Highway Department, was made for the efficient methods employed by Mr. Bob Baker, Superintendent for the contractor, his unusual cooperation with the Highway Department engineers and his interest in producing quality workmanship throughout the job.

In selecting Baker Brothers for the Southern Section Award, the judges mentioned particularly the hole-digging machine, designed and built by the contractor, for preparing shrub and post holes. This machine, while an adaptation of a unit used for some time in the utility field, is new to the roadside-development field in Texas and not only prepared the holes quickly and efficiently but, it is reported, reduced the unit cost of digging holes to approximately half that of hand digging, where hand labor is paid 40 cents an hour. Another special piece of equipment used on this job was the contractor's block sod cutter which contributed to the efficiency of the block sodding on the job.

Western Section Award

In the western section of the country, the Award goes to G. W. Mendenhall & Sons Construction Co. of Springville, Utah, for unusual cooperation, excellence of work and development of special methods and equipment on a 3.784-mile highway grading contract on U. S. 91, on which no roadside-development items were included. This nomination was made by W. H. Earnshaw, Landscape Engineer, and R. Simpson, Resident Engineer, State Road Commission of Utah.

In addition to the extraordinary interest and cooperation shown by Mr. Mendenhall on this job, he developed a special blade for use on a LeTourneau scraper for speeding the topsoiling of slopes along the roadside. This operation, usually done by hand, is a costly and time-consuming job. Through the use of this device, labor, time and costs were reduced. The nomination further states, "We feel that this is a great contribution, not only to the roadside development department, but to the highway department as a whole."

(*Concluded on page* 43)

Here is **ONE** of the **MANY JOBS YOU CAN DO—**

Cutting and Chipping Concrete

WITH

SYNTRON

ELECTRIC HAMMERS

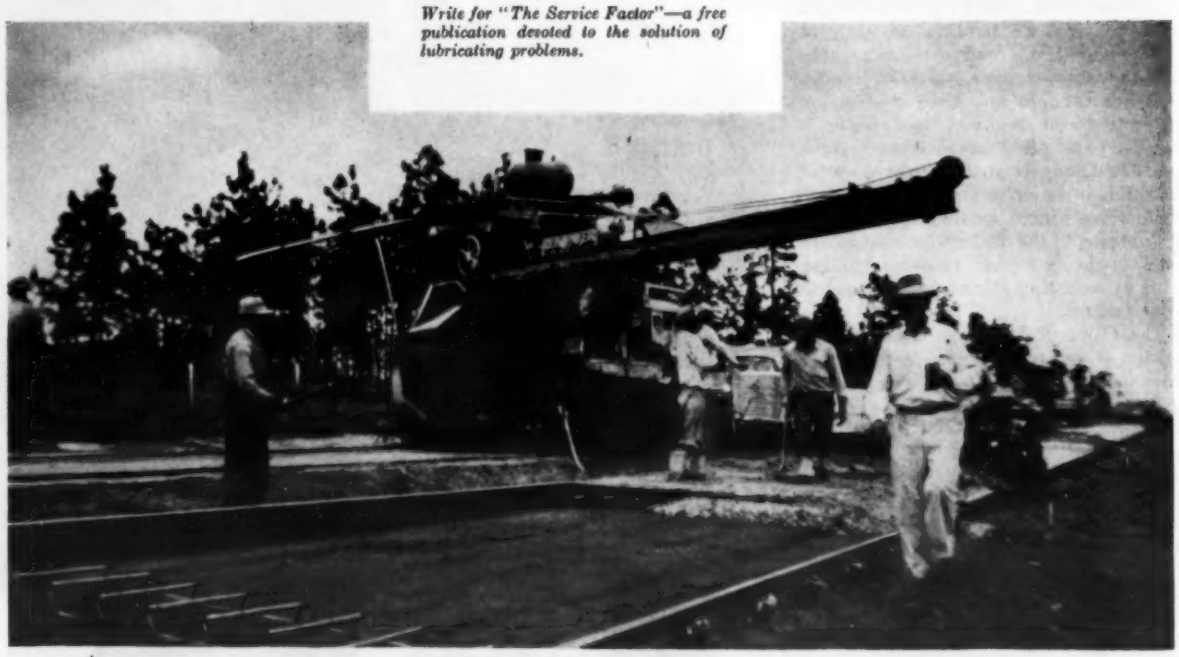
Money — Time and Labor-Saving.

SYNTRON COMPANY
227 Lexington Ave.
HOMER CITY, PA.

RESERVE POWER is as decisive *at home* as at the Front. To keep *CONSTRUCTION* equipment output adequate to war service demands, use . . .

. . . SINCLAIR SPECIALIZED OILS and GREASES. These lubricants give efficient wear protection in the hard grind of full load operation and promote top yield of continuous service hours.

Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.



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HENDRIX

Lightweight DRAGLINE BUCKETS

DE SOTO FOUNDRY, INC. *Mansfield, La.*

LIGHTEST WEIGHT

Bucket on the market—yet the strongest. Hendrix Buckets have been carefully engineered to eliminate every ounce of excess weight, yet more than ample strength is built into those points where needed.

HANDLES MATERIAL BETTER

easier and quicker than heavier buckets. With a Hendrix Bucket an operator can handle more material with less power and with lighter equipment. A saving that frequently represents the difference between profit and loss on a job.

DUMP BLOCK

Hendrix Buckets are equipped with a dump block of the best design, developed by years of experience in the manufacture of dump blocks combined with engineering principles. Dump block fittings are manganese steel.

MANGANESE STEEL CHAINS AND FITTINGS

are standard equipment on all Hendrix Dragline Buckets. On these vulnerable parts depend the serviceable life of a bucket; they carry the greatest strains and are subject to the most wear. For this reason we have chosen to make them of Manganese Steel, a hard, tough material that resists wear and abrasion and has a high tensile strength. Soft steel fittings are optional.

PERFORATED WITH ROUND HOLES

eliminating breaks that regularly occur in buckets perforated with square holes or made with lattice construction due to their very construction. Thus the weight of a Hendrix Bucket is reduced materially and without the sacrifice of strength. The bottom of a Hendrix Bucket is not perforated. Solid Hendrix Buckets without perforation are optional.

REINFORCED SPREADER BAR

Made of I-beam, box section construction for strength, with looselink connections which permit use of discarded drag chains for hoist chains thereby affecting an economy in operation.

ONE PIECE HITCH PLATE AND HOIST TRUNNION

prevents collapsing and buckling of front end, by distributing strain of drag and hoist operations over entire length of bucket. This is a solid steel casting.

ALL WELDED CONSTRUCTION NO RIVETS TO WORK LOOSE

No cracks or corners to bend and break.

REINFORCING RIBS

on bottom of bucket treated with hard-surface metal and ribs extend completely around back to the top of the bucket.

SMOOTH ON INSIDE Notice the perfectly smooth walls and bottom.—There are no rivet heads or other obstructions to hinder loading and clean dumping.

HEAT TREATED BUCKET LIP

Made of heat-treated rolled plate steel, hard-surfaced on cutting edge to prevent wear. Lip is easily replaced without riveting equipment being necessary. Another Hendrix long-life feature.

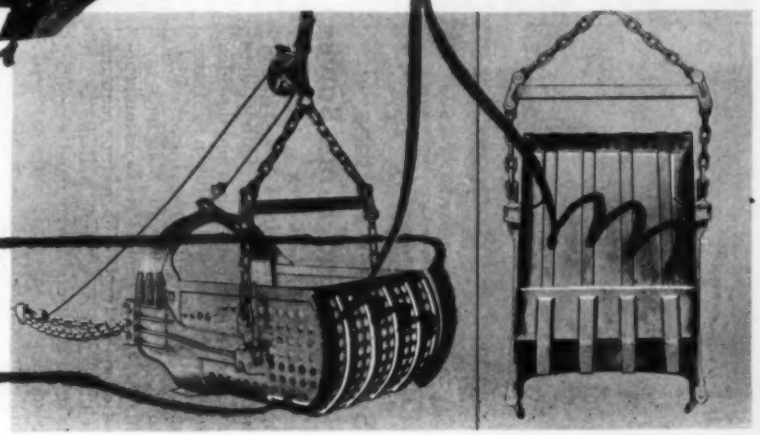
REVERSIBLE MANGANESE STEEL TOOTH POINTS

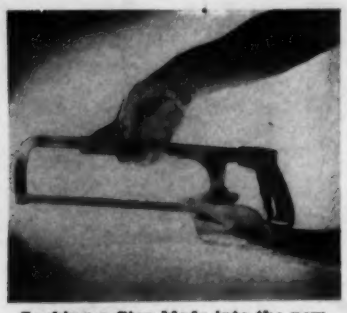
on all teeth, give twice the service of conventional one-piece points. Easily replaced or reversed.

CURVED BACK facilitates loading and prevents spilling.

REINFORCED BOTTOM CORNERS

Hard-surfaced steel shoes are added at these points where excessive wear usually occurs, thus prolonging the life of the bucket shell.





Locking a Star blade into the new cam-action lever-lock hack-saw frame.

Spring-Steel Frames For Hand Hack Saws

A cam-action lever-lock sets up and releases the blade in a new type of hack-saw frame which definitely does away with loose blade studs and threaded tension devices. With this new frame made by Clemson Bros., Inc., Middletown, N. Y., maker of Star hack-saw blades, blades can be replaced or repositioned in a fraction of the time required with frames of conventional design. It is said that straighter cuts and a reduced blade breakage result from the extremely high tension which this new Star frame puts on the blade. This is possible because the frame is made of heat-treated spring steel which has a gun-metal finish to insure high resistance to rust and other forms of corrosion. The handle is made either straight or with pistol grip, molded of rust-free heat-resistant Tenite, a non-conductor of electricity. The frame may be adjusted for 8, 10 or 12-inch blades by pulling out a single pivot pin to its open position, sliding the frame forearm in or out to the desired length, and snapping the pin back into place.

Complete information regarding the new Star hack-saw blade frame may be secured direct from the manufacturer by mentioning this descriptive text.

A Post-War Program For Transportation

Among the major recommendations of the National Resources Planning Board report transmitted to Congress by the President on November 5 is a National Transportation Agency to coordinate Federal transportation activities and to absorb existing agencies as divisions of the new authority. This new agency would "undertake leadership in programs for transport consolidation, terminal unification and reconstruction, coordination of the various transport media, and encouragement of the development of new forms of transport within their respective economic spheres."

While dealing incidentally with some of the immediate problems of war transportation, the report is primarily concerned with transport development policy and states that "it is certain that plans for facilitating the transition of American economy from war to peace at the end of the present struggle will have to deal energetically and forthrightly with the problems of overhauling and rebuilding the basic transportation facilities of the nation".

Recommendations pertaining to highways include the planning *now* of a modern inter-regional highway system and urban express routes to accommodate the automobile of the future. It is suggested that major emphasis in future highway development must be directed to the provision of express highways and off-street parking areas.

On the question of highway financing, the report recommends: 1. State-wide systems of highways specified in each state to be financed entirely through motor vehicle taxes. 2. Federal highway aid to be provided through a Federal tax on gasoline, the proceeds of which would be returned to the states on a need basis. 3. User charges are a means of raising revenue but do not provide an automatic guide to investment. Computation of costs and benefits must be made to determine economic justifications of transport projects. Continuing in this vein, the report states that many thousands of miles of little-traveled roads "have no legitimate claim for improvement with public funds". It also points out that the magnitude of highway needs in and around cities requires the expenditure of more state and Federal funds in these areas.

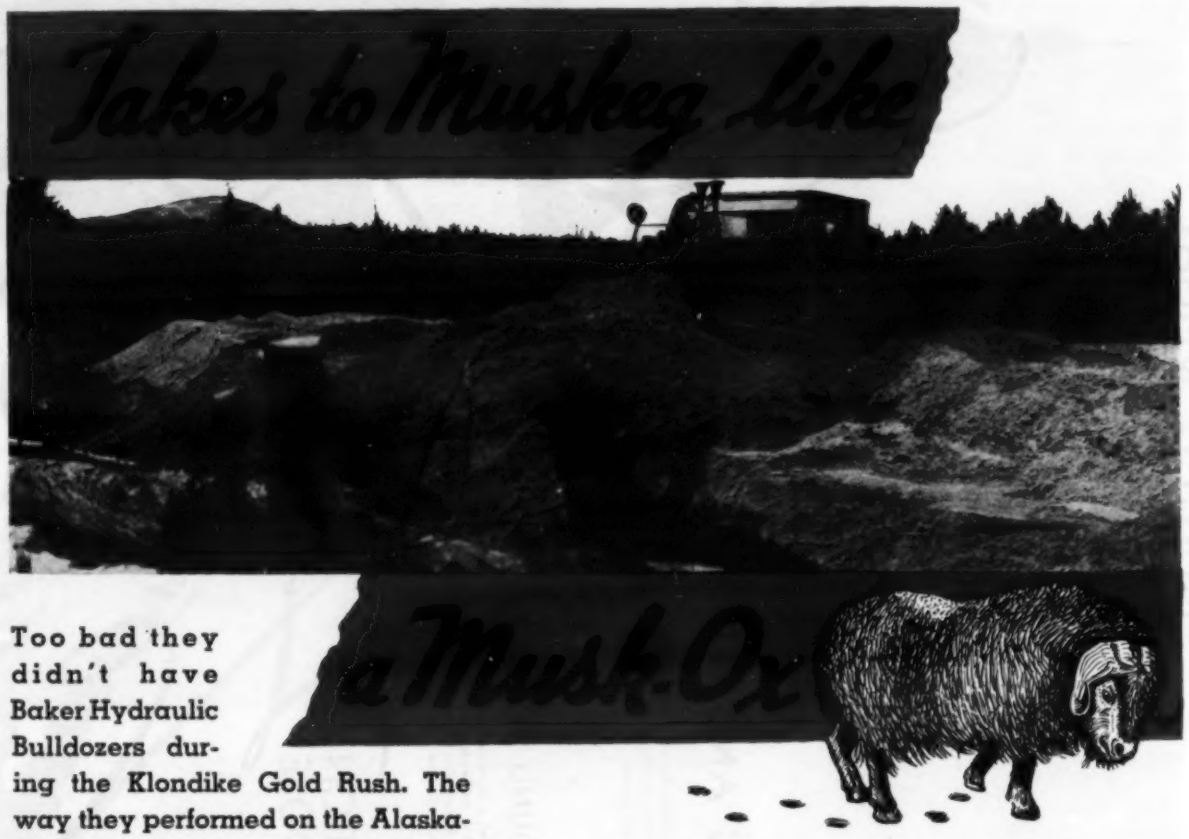
The report also points out that at present the railroads are barred from participation in public works and development programs, and likewise are excluded from public plans embracing physical coordination with other forms of transportation. The extension of Federal Government credit to railway modernization and improvement, and inclusion of such work in public works programs are recommended.

This report "Transportation and National Policy", 513 pages in length and available by mail at $1.25 each from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C., was prepared under the general guidance of Owen D. Young, Chairman of the Advisory Committee appointed for the study. Other members of the Committee were: George P. Baker, Member, Civil Aeronautics Board; Joseph B. Eastman, Chairman, Interstate Commerce Commission; Robert H. Hinckley, Assistant Secretary, Department of Commerce; Jesse H. Jones, Federal Loan Administrator; Rear Admiral Emory S. Land, Chairman, U. S. Maritime Commission; Thomas H. MacDonald, Commissioner, Public Roads Administration; and Major General Eugene Reybold, Chief of Engineers, War Department. Major General Reybold succeeded Major General Schley on the latter's retirement on October 17, 1941.

Synthetic Rubber Plant Goes Into Production

Another of the large-scale government-financed synthetic rubber plants has just begun production operations, according to a recent announcement by the B. F. Goodrich Co., Akron, Ohio, pioneer manufacturer of man-made rubber in the rubber industry.

The new plant, located in Kentucky, will utilize butadiene made from alcohol to produce general-purpose synthetic rubber for use by the armed forces of the United Nations.



Too bad they didn't have Baker Hydraulic Bulldozers during the Klondike Gold Rush. The way they performed on the Alaska-Canada Highway, and Airbase and Supply Depot construction up there, you would think they were first cousins to a Malemute sled dog. Bakers are tireless workers.

They helped to carve roads through spongy muskeg swamps—like eating soup with a fork—but they did it. They bowled over enough trees to keep a hundred pulp mills busy; made cuts in tough shale and heavy gravel; spread, graded and leveled; pushed mired dirt-buggies; rolled logs for bridges, and whatnot. Bakers are versatile.

When the freeze set in, Baker's direct hydraulic down pressure—which puts the full weight of the tractor front end on the blade—was just what was needed to get the finishing touches done.

Bakers keep delivering, even in the frigid zone—use plain fuel oil in the hydraulic system. Ask Comrade Ivan! Bakers took to the Russian tundra like a Siberian musk-ox. On every front, Bakers are bringing *hydraulic pressure* to bear on the enemy!

May we send a copy of "Unsung Heroes of War"?

THE BAKER MFG. CO.
585 Stanford Ave. Springfield, Ill.

BAKER
The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
COMPLETE
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36-40 11th St., Long Island City, N.Y.
Tel. IRonsides 6-8600

Wood Deck Culverts To Outlast the War

Arizona Designs Standard Unreinforced Substructures Of Concrete with Deck to Be Replaced after the War

✦ CAREFUL studies of the use of non-critical materials led the Arizona Highway Department to design a new series of culverts for use in its dip elimination program. The design features the complete elimination of reinforcing steel in all structures up to 4-foot height and then only anchor bars between the footing and the column to develop the full tension value of the concrete. The new standards sheet for culverts contains 132 variants in height and width for single and multiple boxes, using concrete piers and abutments and laminated wood decks, with 1-foot 6-inch to 6-foot 6-inch clear heights, spans of 6, 8 and 10 feet, and roadway widths of 28, 34, 36 and 40 feet.

These wartime culverts are being built to the AASHO standard H-15 loading with 100 per cent overload, at the rate of four or five a year on the Phoenix-Yuma highway alone where over 30 dips have been replaced with safe culvert structures in the past few years. A total of seventeen have been eliminated between Wickenburg and Phoenix. On all reconstruction projects on the strategic network, dips are automatically eliminated as a safety measure even though wartime speeds have somewhat reduced the hazard. Only on secondary access roads are temporary dips being constructed at present.

The new laminated wood-deck culverts were made standard as of August 12, 1942, for the duration of the war and until the steel market again becomes free. The wood decks with the field creosote oil treatment given them are expected to last 10 years, and where pressure-treated creosoted lumber is used, the life expectancy is 20 to 30 years. The decks will be replaced with reinforced-concrete slabs when necessary after the war.

Decks

The laminated decks are built of 2 x 8-inch fir or 2 x 10-inch Port Orford cedar, redwood or Ponderosa pine on edge and, except the Port Orford cedar and redwood which are used untreated, are given a creosote pressure treatment consisting of a 50-50 blend creosote-petroleum oil or a salt treatment such as ZMA, zinc meta-arsenate, or CZC, chromated zinc chloride, or Wolmanized. In place of pressure treatment a field treatment is allowed, either brushed on or applied by dipping the timber separately before assembling, using a 50-50 blend creosote and petroleum oil, or Columbia Wood Preservative Co. preservative as an alternate.

The planks are spiked together with 40d nails 12 inches on centers staggered. Random lengths may be used for the floor where multiple-span structures are built but the splices must be approximately at the quarter points adjacent to the piers and no two adjacent pieces may be spliced in the same span. The flooring is cut to length for splicing before treatment and is selected for uniformity of thickness so as to form a tight floor before placing. In addition to the nailing mentioned above, the ends of the boards have two nails within 6 inches of the end and, if necessary to prevent splitting, holes 1/16 inch less than the diameter of the nail are bored before

(*Concluded on page 29*)

Laying the timber deck of a new double 10 x 3-foot culvert on unreinforced-concrete piers near Mesa, Arizona.

Increase

Concrete Strength

with

MARVEL-KOTE

Tranparent Membrane

CURING COMPOUND

approved and used

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Defense Projects

more coverage per gallon

will not freeze

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North Kansas City, Mo.

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24 PAGES *of*

How to Keep 'Em On-the-Job

IDEAS

HERE'S a brand new handbook for all Lorain owners and operators, full of practical ideas on how to make quick, emergency repairs that will keep your machine going. It will tell you how to temporarily substitute for critical, hard-to-get parts and materials—*how to do more with what you've got.*

Many of the suggestions are temporary expedients only, but they will keep your machine on the job—they will help to salvage and conserve worn parts, and will save you time and money, too. Write for your free copy of the Fix-It Handbook now or clip and mail the pledge form below if you want both the Handbook and a Conservation Emblem.

HOW TO GET THIS CONSERVATION EMBLEM

If you want to show others that you are helping to make your equipment last longer, sign and mail the pledge form below. Regardless of the type or make of your equipment, we will send you a colorful red, white and blue emblem (actual size 5" diameter).

THE THEW SHOVEL COMPANY, Lorain, Ohio

I hereby pledge that I shall do all in my power to prolong the life of any construction equipment in my ownership or care regardless of type or make.

I realize that it is my responsibility to avoid time-consuming delays caused by mechanical breakdowns and will see that frequent inspections are made and that necessary adjustments and repairs are promptly taken care of.

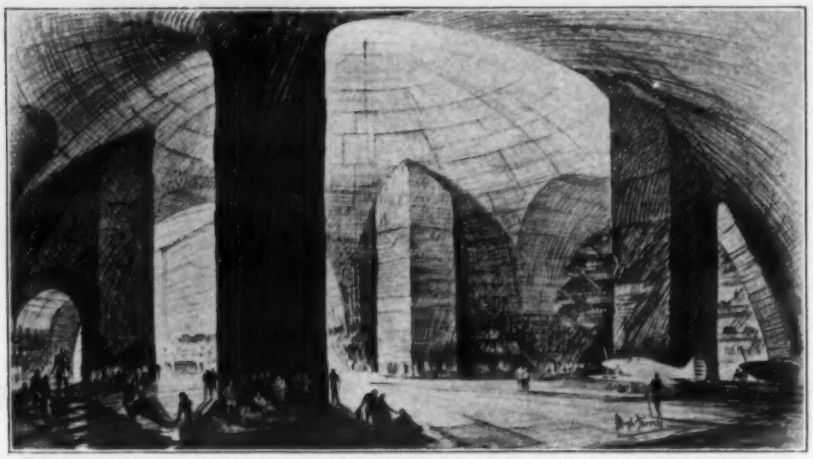
I will avoid waste of parts and materials and will eliminate any abuse of my equipment due to non-recommended operation.

Signed _____

Street Address _____

City _____ State _____

FIX-IT Handbook Wanted..... Lorain Model No..... Serial No.....



George J. Atwell, contractor, of New York City, suggests that a bombproof tunnel could be constructed through the rock cliffs on the west side of the Hudson River to provide not only a shelter for civilians but also a protected area for airplanes. Above is Mr. Atwell's conception of an interior room in the shelter which, he says, would require no critical materials.

Fire Extinguishers Work Automatically

Fire can be one of the most potent forces working for the enemy in these days when loss of life, loss of working time, and loss of critical materials can so jeopardize the war effort. Therefore, special precautions against fire and preparations to control fires which may break out are of vital importance on every construction job and in state and county offices, garages and shops.

A feature of the Red Comet Automatic fire extinguisher is that its action is automatic and therefore it goes to work whether or not any one is around to use it. When a fire brings the temperature up to around 160 degrees, the fuse of the Red Comet melts and releases a powerful coiled spring which crashes a heavy metal slug against the thin glass Grenade, shattering it and scattering the Red Comet fluid in mid air. This fluid changes into fog almost instantly, smothering the fire by preventing oxygen from reaching it.

These Automatics are made in two sizes, Standard and Senior, for wall or ceiling mounting. The wall type can also be used manually, if desired.

A 32-page booklet, entitled "The Book of Proof" and containing many letters from users of Red Comet, describing how their automatic feature prevented serious fires, also contains a description of the Red Comet Automatics and other types of fire extinguishers. Copies may be secured by interested readers direct from Red Comet, Inc., Littleton, Colo.

Watch Your Bridges, Plan Spring Repairs

A recent issue of *Highway Extension News*, issued monthly by the Engineering Extension Department of Purdue University and distributed to local highway officials throughout the state of Indiana, carries some questions and warnings about bridges which it will be well for county and town officials throughout the country to consider seriously. How about a survey of bridge pier and abutment conditions in your jurisdiction, followed by utilization of spare time during the winter months in making a carefully prepared program of patching, underpinning, repointing, etc., to be started next year as soon as weather and stream flow conditions are suitable? The removal of debris, bushes and trees interfering with the proper channel flow at bridge and culvert approaches will save many dollars otherwise required for costly repairs later.

If paint is obtainable, why not make 1943 a bridge-painting year? Steel bridges are practically irreplaceable for the duration and an indefinite period thereafter. Some of these steel structures have not received a thorough cleaning and coating of paint in 20 or 30 years. Rusting has greatly reduced the cross-section of certain critical steel members and seriously weakened many bridges. A spring and autumn removal of all debris, weeds, and bushes from around the end-shoes of all steel bridges, where they are supported on the abutments, will be beneficial in extending the useful life of these structures. Don't be guided by the degree of rusting of the upper parts of these steel structures. The serious rusting is along and below the floor line. Have you ever *seen* the footings, floor beams, and stringers of your steel bridges? You may, and probably will be, surprised. "A stitch in time saves nine" still means what is says.

It is cheaper to have roadside development than it is to go without it.—
Thos. H. MacDonald, Commissioner, P.R.A.

USE TARPAULINS

Order Now!

QUICK SERVICE
NO PRIORITIES NEEDED

Speed construction. Protect vital materials in all sorts of weather. FULTON TARPAULINS will give you maximum satisfaction. Contractors Supply Dealers in every state sell the FULTON line. Specify SHUREDRY and FULTEX. FULTON products are good and prices are right. If your dealer can't supply you, write our nearest plant for catalog, samples and prices.

Fulton Bag & Cotton Mills
Manufacturers Since 1870
ATLANTA ST. LOUIS DALLAS
MINNEAPOLIS NEW YORK NEW ORLEANS KANSAS CITY, KAN

SWING IT for VICTORY

The output of any shovel depends on the operator's "know how." Check your shovel performance with the list below and perhaps you'll find a point or two that will help. We all want to win this war the quick way . . . let's go!

1. Keep the swing short . . . spot trucks in close.
2. Cut a thin slice up along face so the dipper comes up fast and easy. Don't overcrowd!
3. Keep dipper teeth sharp.
4. Set pitch braces for fast digging. Angle of teeth should usually match average angle of bank.
5. Keep your friction clutches right. You can't dig fast with a sloppy clutch adjustment.
6. Loosen the bank while you wait for trucks.
7. Overlap your cycle . . . have dipper at right height for dumping when it swings over truck; swing and lower; come in crowding.
8. Move up often, work your bank close.
9. Steady does it — keep 'em swinging.

FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS AND STAMPS

ARMY E NAVY

Bucyrus-Erie employees have accepted the award of the Army-Navy "E" as a challenge to keep production rising. * *

Bucyrus-Erie

SOUTH MILWAUKEE • WISCONSIN • U. S. A.

Enlarged reprints of this ad are available for your bulletin boards. In the reprints, the Bucyrus-Erie signature is omitted to leave room for your own name. Write for your copies.

A Stabilized Base For Military Loop

Dean Word, Contractor, Set Crushing Plant in Quarry To Furnish Flexible Base For 8½-Mile Contract

✦ THE now well-known loop highway project around San Antonio, Texas, is rapidly becoming a reality. Conceived as a means of reducing congestion in the center of the city where all through highways converge, it became an important piece of military construction with our entry into the war and the increase in number and size of training centers in the environs of San Antonio.

With a 12-inch base 42 feet wide providing continuous 10-foot parking shoulders, the new roadway has all the attributes of a military highway for the assembly of convoys, fast movement of troops and short connections between various military centers without entering the congested civilian areas. The section awarded to Dean Word, San Antonio contractor, on his bid of $206,471.47, was DAWR 3B1, Contract 1, about 7 miles in length with an additional 1½ miles of connecting links, and called for grading, drainage structures and base.

The Quarry Operation

To provide the base material of proper quality, the contractor set up a complete crushing and screening plant in a local quarry just off the right-of-way, paying the owner the royalty for the material on the basis of the quantity of material delivered to the roadway. The pit of 4½ acres was drilled by Gardner-Denver jackhammers, three of which were operated from one Gardner-Denver portable compressor pulled about as required by a D5 tractor. Material was shot with 40 per cent gelatin dynamite and although the material is only moderately hard there were many large pieces not easily handled by the shovel. The pit was kept trimmed by a D7 tractor and LeTourneau bulldozer so that the Northwest 1½-yard shovel could put in all its time loading to the four shuttle trucks.

The trucks dumped direct to a steel chute leading into the opening of an 18 x 40 Pioneer jaw crusher driven by an International diesel engine through V belts. A short horizontal feeder belt picked up the crusher-run material and delivered it to an inclined belt 110 feet in length which raised it to the top of the double-deck vibrating screens. The oversize from the screens was divided and flowed down to a pair of 40 x 20 double roll crushers which delivered the crushed material to the main belt to the screens, thus closing the circuit. The main belt and both roll crushers were also driven by International diesel engines of various sizes.

The plant was operated two 10-hour shifts for seven days a week, producing an average of 1,802 cubic yards daily. For maintenance purposes at the plant, the contractor kept a complete tool shop and a 2-wheel trailer on which were mounted a Lincoln electric welder and a Welderz Frend acetylene generator. The plant personnel consisted of two men feeding the jaw crusher which had no grizzly, one man on the jaw crusher, one mechanic, one oiler, two bin men, and one man to spread the loads on the trucks as they pulled away from the bins.

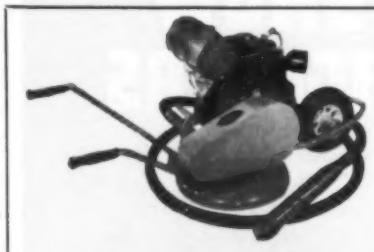
Hauling and Spreading

A fleet of from 10 to 22 trucks was used for hauling the crushed and screened material from the bins to the road. The base was laid in three 4-inch courses 42 feet wide and feathered at the edges with the maximum stone 2 inches and graded for maximum density on compaction. The trucks dumped their 4-yard loads down the center of the road as close as they could be placed and then a Caterpillar No. 12 motor grader cut into the dumped windrow just suf-

(*Concluded on page 36*)

C. & E. M. Photo

The crushing and screening plant for providing crushed gravel for a stabilized base for a section of new loop highway around San Antonio, Texas.



MARVEL

CONCRETE VIBRATORS ARE STILL AVAILABLE FOR WAR PROJECTS

Marvel Equipment Manufacturers, Inc.
224 So. Michigan Ave., Chicago, Ill.

Maintenance starts with the Shot

AMERICAN
CYANAMID & CHEMICAL CORPORATION

EXPLOSIVES

Correct Blasting will minimize maintenance *right down the line*

BREAKING rock or other material down to the right sizes—avoiding big lumps as well as fines—is the result of correct blasting practise. It means minimizing wear and tear on steam shovels, trucks, cars, hoists and crushers. It helps every piece of equipment work at its best, with the least maintenance cost.

AMERICAN Explosives and Blasting Supplies are made under exacting specifications in well equipped plants. Chemical control and thorough inspection insure adherence in manufacture to the methods and processes developed by our research.

Today, as never before, efficient blasting is all-important. Capable technical service men are available to assist you with your blasting problems.

- **HIGH EXPLOSIVES**
- **PERMISSIBLES**
- **BLASTING POWDER**
- **BLASTING ACCESSORIES**

American Cyanamid & Chemical Corporation

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EXPLOSIVES DEPARTMENT

SALES OFFICES: Pittsburgh, Pa. Bluefield, West Va. Scranton, Pa. St. Louis, Mo. Chicago, Ill. Pottsville, Pa. Hazleton, Pa. Maynard, Mass.

Features of Design Of Earth Dam in Idaho

(*Continued from page 2*)

time as it was clearly foreseen that there would be a power shortage due to the increase of mining operations in the state or adjoining territory. All other materials of construction, except cement, were produced on the site.

Work was started on this contract September 27, 1941, with a contract allowance of 1,670 calendar days for completion. The job was one year ahead of schedule when shut down because the contractor pushed the driving of the diversion tunnel to completion during the winter of 1941-42 and had the stream diverted by May 17, 1942, instead of in the spring of 1943 as the original plans contemplated.

Anderson Ranch Dam, 42 miles upstream of Arrowrock Dam, will when completed furnish supplemental water to 340,000 acres of irrigated land and make possible the development of 104,000,000 kwhr annually. It will aid in the development of southwestern Idaho and can eventually serve the Mountain Home area some 40 miles south of the state capital, Boise.

The reservoir capacity will be 500,000 acre-feet, of which 212,500 acre-feet are allocated to flood control, 212,500 acre-feet to irrigation storage, 45,000 acre-feet to power development, and 30,000 acre-feet to silt control. All of the flood control and irrigation water can be used for the development of power in addition to their other services.

Features of Design

Anderson Ranch Dam will be essentially an impervious core supported by stable pervious sections. The mass of earth and rock to be piled up to form the dam will be 9,600,000 cubic yards or three times the mass of concrete in Boulder Dam. The crest elevation is 451 feet above the lowest cut-off, making the dam the highest of its type in the world. From the crest to the stream bed is 330 feet, and if considered on water depth only, it then becomes the second highest in the world, exceeded only by Mud Mountain Dam. The dam is confined by the canyon walls with the spillway in the left canyon wall while between the spillway chute and the toe of the dam is the power house. The steepness of the canyon walls above the dam required heavy rock cuts for the spillway area and at the back of the power house.

The diversion tunnel will deliver water to the steel penstock for power development. The penstock is 15 feet in diameter and will serve two 15,000-kva 21,000-hp main generating units, and five hollow-jet valves 72 inches in diameter will control the water from the outlet structure. The diversion tunnel, 20 feet in diameter and concrete lined, will become the upstream part of the penstock for power development. A high-inclined tunnel inlet structure extends from tunnel level to low water elevation and with its 15-foot 3-inch x 30-foot bulkhead gate will provide emergency closure of the penstock and tunnel in case of necessity.

Other feature dimensions of the dam include its 1,350-foot crest length across the canyon. The crest is at Elev. 4,206.0 and is 40 feet wide. The distance from toe to toe is 2,500 feet. The upstream slope is 3 to 1 for the upper 114 feet, then 3½ to 1 to the river level except for a 50-foot berm at Elev. 3,960 which is the elevation of the top of the permanent cofferdam. The downstream slope is 2 to 1 for the upper 114 feet, then 2½ to 1 for the next 100 feet of height. The remainder of the slope to river level is 8 to 1 while the last 30 to 40 feet of the downstream toe is cut off on a 1½ to 1 slope.

Foundation and Cut-Off

The bedrock of the structure is an erratically disintegrated granite with dikes of pegmatite and biotite, and seams of clay. This led to the design of a rather broad-base cut-off trench, which was excavated to relatively sound rock. Extensive grouting of the bedrock was necessary and two concrete cut-off walls were provided to insure the stoppage of percolation.

The river bed for a depth of 135 feet was filled with a uniform medium sand and layers of clay which has a high percolation rate. Only the section of the dam immediately beneath the impervious core, that is, the cut-off trench, was carried to bedrock. The remainder rests on the natural stream bed after some minor stripping. The cut-off trench is 200 feet wide at the bottom and has slopes of 1¾ to 1 on the upstream side and 1½ to 1 on the downstream side. The two cut-off walls with footings in bedrock vary in height from 5 to 16 feet in the backfill and are designed without reinforcing steel.

The Spillway

The spillway as designed has a maximum discharge capacity of 20,000-cfs regulated by two 25 x 22-foot radial gates. The spillway chute is very steep for an open channel section and is cut in rock and lined with concrete anchored to the rock. The channel flares from 53 feet wide near the top to 100 feet at the stilling basin. As the contractor proceeded with the work, it was planned to move dirt through to freezing weather and then push the spillway construction in rock through the winter and place the rock in the downstream portion of the dam. The rock breaks well with 20 per cent gelatin dynamite.

Power and Lighting

Electric power for the construction of the project was provided by the Idaho

(*Concluded on next page*)

Model NH5W with 4-30,000 C.P. floodlights.

The NITE-HAWK Gives You:

LIGHT—Where you want it—when you want it.

POWER—To operate hand tools—saws, drills, hammers, etc.

Floodlight and Searchlight Units up to 14 million candlepower.

Write for Bulletin 161

LISTER-BLACKSTONE, Inc.

1706 So. 68th Street, MILWAUKEE, WIS.

Clean as a Smooth Shave

WHEN YOU PEEL PACKED SNOW

SCRAPING hard-packed snow and ice from a busy roadway is a job that calls for specially designed trucks equipped with pressure center scrapers. A front-mounted plow cannot exert the pressure needed for this work. Outstanding results are obtained with Walter Snow Fighters, mounted with Walter Pressure Center Scrapers.

Only with the unique Walter Four-Point Positive Drive is it possible to obtain the steady flow of power necessary to insure a smooth, uninterrupted scraping action. The scraper is so designed as to surmount road obstacles without damage to scraper, truck or road . . . and the entire unit is so flexible that it can wind in and out of traffic quickly and easily. When there is a heavy snowfall, it is only necessary to add the V Plow and side wings as shown in the photograph at the right. Write for details.

with
WALTER SNOW FIGHTERS

WALTER MOTOR TRUCK CO.

1001-19 Irving Ave., Ridgewood, Queens, L. I., N. Y.

Big Figures Feature Anderson Ranch Dam

(*Continued from preceding page*)

Power Co. while the contractor had his own standby plant at the site. A power line was brought in from Mountain Home, a distance of 30 miles, at 66,000 volts. Current at 2,300 volts was used for the motors, 440 volts on the pumps, and 110 volts for domestic service.

For lighting the wide area of the dam foundation and the earth embankment as it rose from the river bed, the contractor installed three high lines 100 feet apart carrying 500-watt incandescent bulbs spaced 30 feet apart. The lights on these spans were controlled by a time clock so that it was unnecessary for an electrician to climb the steep abutment to turn them on and off. Floodlights were spotted over the entire area to give the best possible illumination in the interest of safety and maximum production. Some of these lights were placed as though it were the idea to provide stage lighting as they were tucked away in cracks and crevices in the high rock crags. The reason for this was the protection afforded against any possible flying rock or other material that might damage the lights.

The Contract and Major Quantities

The original contract for the completion of the dam and appurtenant structures was for $9,986,203.00, but certain work orders, made necessary by the changes in the borrow pits as investigated after the contract was signed, increased the contract price by $760,000.00 and decreased the price by $1,028,850.00, making a net decrease of $268,850.00. The work started with all labor working 40 hours per week, but this had been raised to 48 hours per week, working two shifts. During the autumn, the crews worked three shifts to clean up all work in the bottom before cold weather.

The major quantities involved in this large contract include:

Excavation, stripping	710,000 cu. yds.
Excavation, common	320,000 cu. yds.
Excavation, rock	860,000 cu. yds.
Excavation, in tunnel	27,000 cu. yds.
Permanent tunnel supports in place	100,000 lbs.
Steel tunnel liner plates and lagging, in place	100,000 lbs.
Excavation, dam foundation	1,676,000 cu. yds.
Excavation, cut-off wall footings	2,300 cu. yds.
Excavation, from borrow pits	9,040,000 cu. yds.
Earth fill in embankment	7,376,000 cu. yds.
Sand and gravel filter blanket, downstream slope	110,000 cu. yds.
Cobble and rock fill, downstream slope	1,900,000 cu. yds.
Riprap, upstream slope	90,000 cu. yds.
Dumped riprap in spillway channel	3,000 cu. yds.
Sewer drain in gravel, 4-inch	3,000 ft.
Sewer drain in porous concrete, 4-inch	2,850 ft.
Sewer drain in gravel, 6-inch	2,500 ft.
Sewer pipe with cemented joints, 12-inch	300 ft.
Drilling weep holes	1,500 ft.
Drilling line holes for rock excavation	80,000 ft.
Core drilling, 5½-inch holes, to 30 feet	1,000 ft.
Grout holes, 1⅜-inch, to 30 feet	34,000 ft.
Grout holes, 1⅜-inch, 30 to 50 feet	11,000 ft.
Grout holes, 1⅜-inch, 50 to 100 feet	10,000 ft.
Grout holes, 1⅜-inch, 100 to 150 feet	4,000 ft.
Placing grout pipe and fittings	20,000 lbs.
Pressure grouting	75,000 cu. ft.
Pressure grouting with packers	10,000 cu. ft.
Drilling holes for anchor bars and grouting in place	17,000 ft.
Concrete in embankment cut-off walls	3,800 cu. yds.
Concrete, structural	49,470 cu. yds.
Reinforcing bars in place	4,700,000 lbs.
Installing radial gates	86,000 lbs.

Personnel

The Anderson Ranch Dam is being built under the direction of the Bureau of Reclamation, with John A. Beemer as Construction Engineer and Ferd Schlapkohl as Office Engineer. The contractors are Morrison-Shea-Twaits-Winston, with V. A. Roberts as Project Manager, and William Woodall, General Superintendent.

C. & E. M. Photo

The MSTW shops and warehouse at Anderson Ranch Dam, Idaho.

Want information? Write the Editor.

Spatterproof Lamp For Rough Service

A new type of spatterproof lamp for welding and rough industrial service has recently been introduced by the Radiant Lamp Corp., 260 Sherman Ave., Newark, N. J. This new lamp is made of a special glass which resists penetration of hot metal particles, and is built to withstand severe handling. Sizes include 50, 75, 100 and 150 watts. Because of its special features, it is also suitable for use on tunnel jobs.

Another new lamp which is guaranteed not to crack due to climatic conditions, even when used outdoors in an open fixture, has been added to the company's line of weatherproof lamps for general lighting service on construction jobs and similar service. The complete range is now from 200 to 2,000 watts.

Detailed information on these new Radiant lamps, as well as on its full line of construction lights, may be secured direct from the manufacturer by mentioning this item.

Complete Line
of
DERRICKS
and
WINCHES

SASGEN DERRICK CO.
3101 W. Grand Ave. Chicago, Ill.

Athey Forged-Trak Trailers

KEEP SUPPLIES ROLLING

Through "Impassable" Alcan Mud!

Transportation of supplies and materials in the pioneering stages of the Alaska Highway was an important phase of this miracle of highway construction.

Rolling over swampy, miry, freshly broken trails, Athey Forged-Trak Trailers served as supply trains for the construction crews. They hauled many tons of freight over sections that would have stumped other means of transportation.

Athey is proud of the part its machines played in the building of this strategic military road because both the engineers and equipment on the job have made history!

On duty on other fronts throughout the world, Athey Trailer equipment is providing reliability in hauling against the toughest kind of footing conditions. Loads roll easily on smooth steel rails—weight is evenly distributed over a broad area.

In peacetime, too, there are many difficult transportation problems that can be economically solved with the all-weather dependability of Athey Forged-Trak Trailers. Athey Truss Wheel Co., Chicago, Illinois.

"NICE GOING U.S.A.

YOU'VE WON A BATTLE THAT'LL HELP US WIN A WAR."

To our armed forces everywhere, the opening of the Alaska highway is welcome news. To them it flashes, "We're On Our Way."

America is moving like a great giant, gradually working into position for the death squeeze on the Axis. The Alcan Highway takes the freedom-loving people of the world nearer to the day of Peace.

Its early completion, in spite of tremendous obstacles faced by the contractors and engineers, displayed the spirit and determination that makes America the sure winner in this global war!

Athey FORGED-TRAK TRAILERS

State Highway Care On Long Island, N. Y.

District 10 of State Dept. Of Public Works Comprises Whole of 1,494 Sq. Miles

✦ FORMERLY administered from Poughkeepsie as a part of District 8 of the New York State Department of Public Works, Long Island was created a separate district in 1930 and designated as District 10. This District serves an area of 1,494 square miles in which there are 408 miles of state highway, 80 miles of parkways in the Long Island Parkway system and many hundreds of miles of city streets in that portion of New York City comprising the boroughs of Brooklyn and Queens on Long Island. District 10 supervised the construction of a portion of the city and Long Island parkways but is not responsible for their maintenance. State highway construction has been practically nil for several years while such projects as the New York City Belt Parkway and the Hutchison River Parkway Extension were under construction. As recently as 1934, District 10 had as many as 42 major contracts running at one time, but in the last three years the contracts have been larger but fewer.

State Highways

The following two tables show the state highway mileage in District 10 by types and its division between the two counties comprising the district; the second table gives the total expenditures for maintenance from 1934 through 1942.

STATE HIGHWAY MILEAGE BY TYPES, DISTRICT 10, NEW YORK

Type of Pavement	Nassau County	Suffolk
Concrete	99.11	266.01
Asphalt	15.59	21.18
Gravel	....	2.81
W. B. Macadam	....	3.06
Total Miles	114.70	293.06

MAINTENANCE EXPENDITURES DISTRICT 10, NEW YORK STATE

	Maintenance
1934	$332,622
1935	345,837
1936	335,751
1937	340,683
1938	376,854
1939	333,380
1940	358,075
1941	378,240

Highway Maintenance

The highways in District 10 are mostly of concrete construction built since 1924 which has reduced considerably the amount of maintenance of the traveled roadway. Where extensive maintenance is necessary on state highways, the work is frequently let by contract, although it may be done by state forces. This is made possible by the item "M&R" indicating maintenance and reconstruction, and it is this latter item which is the portion usually let to contract. Maintenance takes the form of patching, surface treatment, shoulder shaping, the repair and clearing of drainage structures, mowing and, in winter, sanding of the highways. Snow removal is handled entirely by the counties, towns and municipalities.

For maintenance of the shoulder against the pavement, a 2½-inch plant-mix is preferred on a base 2½ to 3 inches thick of gravel, cinders or old road metal. The next-best shoulder maintenance is the oiling of the existing soil to produce an oil mat which increases in thickness and stability with each annual oiling. Usually three annual spring treatments make a good shoulder and thereafter the shoulder is

(*Continued on page 32*)

C. & E. M. Photo

The shops at District 10, New York State Department of Public Works, with an ornamental flagpole, a memento of the New York World's Fair.

Ransome 34E Single and Dual Drum Pavers are doing it . . .

In the field for about two years, the Hydraulically-operated Boom Bucket Gates of Ransome Pavers give operators these time and money-saving advantages:

√ Eliminates split batches on narrow roads and at expansion joints.

√ Permits discharge of any part of bucket load at any bucket position on boom without returning bucket to paver. Boom can then be swung to next slab to discharge the balance. Thus, each time a split batch is avoided a batch in mixing time is saved.

√ Clearance from ground to bottom of open bucket gates is 25 inches for clearing template pullers and scratch boards.

√ Bucket gates can be opened to any degree at any position on the boom.

√ A batch of concrete can be spread completely across a 25-foot runway with paver working outside of form.

√ A simple foot-pedal operation controls opening of bucket gates to any desired degree. Gates are tightly closed by spring action, making the return trip to paver unnecessary as the conventional trip-action is eliminated.

√ Bucket has no inside mechanism or obstructions which leaves full opening to permit free flow of dry concrete.

√ Dripping concrete eliminated by one-half inch over-lap of bucket gates.

√ Bucket gates are operated through an independent cable eliminating wear on boom bucket travel cable.

Write for Literature

RANSOME MACHINERY COMPANY DUNELLEN NEW JERSEY

...FOR...
STARTING . . HOISTING
SWINGING and STOPPING
with GATKE
High-Heat- Resisting
Asbestos Brake Materials.

GATKE MAKES
Brake Lining
Clutch Facings
Frictions
Non-Metallic
Bearings
Sheet Packing

Specially engineered and service-proved for all Brakes and Clutches of Excavating, Road Building and Construction Equipment.
We understand service requirements — just tell us what you need.

GATKE CORPORATION
224 N. LaSalle St. Chicago

Presenting the new Whiteman *adjustable screed cap*

A BRAND NEW IDEA IN SCREED STAKING METHODS, OFFERING NUMEROUS ADVANTAGES, SOME OF WHICH ARE OUTLINED BELOW:

See two bottom illustrations showing how Whiteman Adjustable Screed Caps are applied

1. Contractors can make up their own 2 x 2 wood stakes right on the spot, cut to proper length to suit the actual conditions of each job—using short stakes for hard ground, or longer ones for fills of various depths.

2. This adjustable screed cap is cast of tough malleable iron to give long service.

3. The metal cap is not likely to be broken up by driving, since a wood stake is first driven in, the cap then set on and adjusted to the proper level.

4. For decking, the wood stake is cut to the proper length and fastened to the deck.

5. The use of wood stakes instead of steel effects a conservation of that critical material.

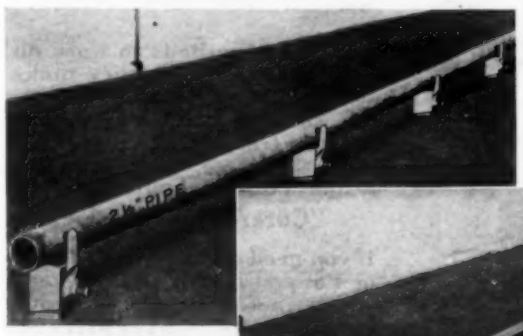
6. Instantly adjustable; unnecessary to disturb the stake itself.

7. Either a wooden 2 x 4 or a 2½" pipe is satisfactory for use as screeds.

Whiteman Hand Grill Tamper

Denser, More Level Floors Without Dry Topping

You get a denser floor with more even distribution of finer aggregates on the surface, when you prepare the slab with this Grill Tamper. With a good concrete mix, dry topping is unnecessary. The "Whiteman" Tamper knocks heavier aggregates down—leaves a "fat" sufficient for finish. This inexpensive, lightweight, collapsible and adjustable Tamper saves time and money on all types of surfaces. Write today for full information.



Whiteman Adjustable Screed Cap as applied to 2½" iron pipe

Whiteman Adjustable Screed Cap as applied to wooden 2 x 4

Step
SCREEDING—4 cu. yd. of 1-in. slump concrete leveled and compacted in five minutes.
Step
FLOATING — Will work 1,000 sq. ft. of heavy duty dry mix in less than 15 minutes. A dense mass is produced with a "fat" surface, ready for finishing.
Step
FINISHING — Using the same WHITEMAN machine as for floating, attach adjustable finishing trowels; 1,000 sq. ft. is brought up in 15 minutes to a hard, dense surface free of voids and laitance.

The Above Shows the Whiteman "3-Step" Method

STEP 1 — SCREEDING

WHITEMAN Rodding Machine has power-driven screeds which simultaneously level and compact the mix while pulled forward by one man. Handles 4 cu. yd. of low slump mix in 5 minutes.

STEP 2 — FLOATING

One man operating the WHITEMAN Finishing Machine with "Heavi Duti" rotating trowels covers 1,000 sq. ft. in 15 minutes.

STEP 3 — FINISHING

Using the same WHITEMAN Finishing Machine converted by changing to "Finish" trowels, the same operator produces a dense hard, long-wearing surface in record time. No hand work and better surface are the results.

Whiteman MANUFACTURING CO.

3249 CASITAS AVENUE — Dept. C — LOS ANGELES, CALIFORNIA

Tractor Maintenance By Modern Methods

Building Up Worn Parts By Welding or Metallizing Saves Metal and Lengthens Service Life of Parts

✦ TRACTORS and heavy excavating units equipped with crawler mechanisms receive the hardest usage of all machines in the construction field. Constant reversing of direction, travel over rough terrain causing undue pressure and excessive impact at first one point and then another, and finally the operation of the crawler mechanism in dust, mud, and slurries of abrasive material, greatly shorten the service life of drive sprockets, idlers, track rollers and the track itself.

In discussing the Alcan Highway at the Highway Research Board dinner in St. Louis, Thomas H. MacDonald, Commissioner, Public Roads Administration, spoke repeatedly of the remarkable field facilities maintained by the contractors on that work. Many well-equipped shops of considerable size were shown in the colored slides in the most isolated sections where new parts were scarce and repair time always at a premium. Those contractors carried on with a minimum of delay because they had prepared and planned adequate repair facilities and they established a truly remarkable reduction in "time down".

The service life of construction equipment depends on two major factors: first, the care of the equipment through proper adjustment and lubrication while in service; and second, the extension of the service life of worn parts through the methods now available to contractors and highway departments for use either in their field shops or in the more permanent shop where the usual winter overhaul is done, or in highway department shops where the regular seasonal overhaul of highway department equipment is scheduled. The repair or rebuilding methods available are the repeated building up of worn parts with a hard-surfacing alloy by the usual arc welding procedure, and the use of metallizing or spraying of molten metal onto the worn part to replace the metal lost in active service. This latter is more frequently used for bearing and shafts while the former is outstanding for the repair of worn sprockets, shoes and tracks where the wear may be more severe and extensive before the repair is necessary to the proper operation of the machine.

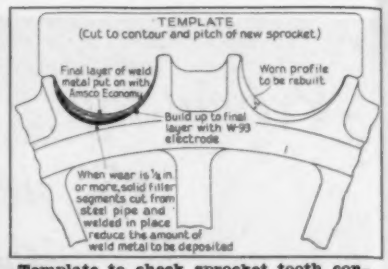
Conservation

Conservation of present equipment through lubrication and rebuilding of parts is more important today than ever in the history of modern construction. Modern equipment is sturdily built and requires only the minimum of care and consideration to secure the greatest service during the economic life of the machine. To proper lubrication and adequate maintenance must be added avoidance of overloading and overspeeding. On equipment with crawler mechanism all working parts must be protected as much as possible from the inroads of dirt. A few hours of operation with dirt and abrasives in gears and bearings will cause more wear than thousands of hours of normal operation. Be sure that all seals are seating properly; that all bolts and nuts are tight, because gasket material will shrink with age; and that all breathers are clean. Keep all lubricants in closed containers to prevent the entrance of dust.

As a conservation measure in the rebuilding of tractor parts, the use of arc welding and metallizing are of great importance as they conserve about 90 per cent of the metal already in the gear or other part, as seldom does the amount of metal necessary for the repair job require more than 10 per cent of the weight of the part in order to place it back into service. Again much time is saved by thus repairing parts, as many delays occur nowadays in the delivery of new parts, no matter what your priority. Finally the rebuilt parts frequently wear from 20 to 100 per cent longer than the original part because of the harder metal used in the repair. Either arc welding or metallizing is often much less expensive than the new part which would otherwise be required.

Preparing for Servicing

The parts which we shall consider in this discussion include the driving sprockets, idler wheels, track rollers, tractor grousers, tracks, and crankshafts and driving axles. The procedure differs for the various methods of depositing the metal and for the different parts. Certain jigs and templates have been developed by various contractors and shops, or have been suggested by various manufacturers in their service bulletins to aid the mechanic or welder in making a specific repair or in rebuilding the worn part. We heartily recommend that the shop be sure that all possible literature on the subject be secured from the manufacturers of arc welding equipment, as well as from the makers of the electrodes employed. By a careful study of the methods they suggest, with the added experience of the welder himself, and the facilities he already has at hand, there can be remarkable savings in the operations at each shop.


TEMPLATE
(Cut to contour and pitch of new sprocket.)
Final layer of weld metal put on with Amsco Economy
Worn profile to be rebuilt
Build up to final layer with W-93 electrode
When wear is ¼ in. or more, solid filler segments cut from steel pipe and welded in place reduce the amount of weld metal to be deposited

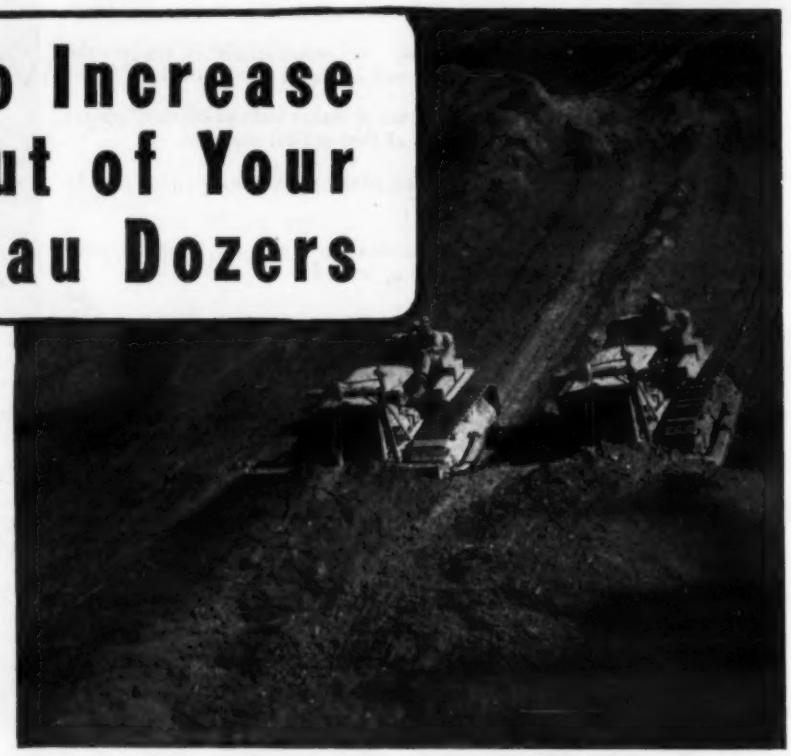
Template to check sprocket tooth contour before rebuilding worn sections.

Tractor Drive Sprockets

When tractor drive sprockets begin to show such wear that the track bushings

(*Continued on page* 48)

2 Ways to Increase the Output of Your LeTourneau Dozers



Doze in Slot or Work Two Dozers Side by Side to Step Up Yardage

Here are two operating tricks, which will enable you to increase Dozer yardage on excavating and stripping jobs. Try them with your LeTourneau Dozers on such work as:

Short haul excavation; shoving sand, gravel or ore to hoppers, conveyors or grizzlies; stripping overburden on short hauls; wasting spoil, especially in large banks; feeding material to shovels.

See for yourself how they increase the material you can handle without extra men or extra tractors.

Build Up Load by "Slot" Dozing

With a single Dozer you gain extra yardage by working in a narrow bowl-wide cut or "slot." Sides of cut act as side-boards, keep material from windrowing out the ends, and build up the load ahead.

Working Two Up

If you have two tractors equipped with LeTourneau Dozers, work them side by side whenever possible. The extra material which rolls along between the Dozer bowls will give you an extra yard or two each trip.

EXTRA PAY YARDAGE PER TRIP

These operators make use of LeTourneau Dozers side by side doubly effective by dozing several loads to the brink of the hill before starting the trip down together.

Put these methods to work on your job. See how they make it possible to increase the yardage you can handle with your present tractors.

See Your LeTourneau—"Caterpillar" Dealer

If you need a LeTourneau Dozer or Power Control Unit to keep your tractor busy, ask your LeTourneau-"Caterpillar" dealer for help on WPB releases. He can help you with your service and repair problems, too. Make him your Victory Construction headquarters.

LeTourneau Dozer feeds clay to portable trap for truck loading at Santa Fe Dam. Note how "slot" keeps material from windrowing and helps build up load.

LETOURNEAU

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TRACTOR CRANES. *Name Reg. U. S. Pat. Off.

COMMERCIAL HEAT TREATING SEASONING OF STEEL

CADMIUM and HARD CHROME PLATING

ALL KINDS OF GRINDING OPERATIONS

A COMPLETE MANUFACTURING PLANT

AGERSTRAND CORPORATION

Muskegon, Michigan

Sales Office: 1900 E. Jefferson Ave., Detroit, Mich.

Utah Flight Strip For Emergency Use

Construction of the first inland Flight Strip has started in Utah, according to reports from the Utah State Road Commission through the *Salt Lake Telegram* and confirmed through official sources. Bids were taken September 1, 1942, for a bituminous-surfaced runway on a stabilized gravel base. The contract requires 200,000 cubic yards of unclassified excavation.

The site of the Flight Strip is an existing emergency landing field for commercial planes where there had been no grading of the level all-over landing field, but beacon and landing lights had been installed.

New Chain Belt Director

At a recent meeting of the Board of Directors of the Chain Belt Co., A. R. Abelt, Secretary of the company, was elected a Director to replace F. J. Weschler of the Baldwin-Duckworth Division who died in November. In addition, Mr. Abelt, who has been with Chain Belt since 1907 and Secretary of the company since 1930, was elected a Vice President.

G. D. Gilbert, Sales Manager of the Baldwin-Duckworth Div., located at Springfield, Mass., has been made General Manager of that Division and also Secretary of Chain Belt to succeed Mr. Abelt. He is also a Director of the Chain Belt Co.

Ready-Mixed Concrete

A profusely illustrated 40-page treatise on stationary and portable ready-mixed concrete plants, with a complete discussion of the design of plants to suit local conditions, has been issued by Butler Bin Co., Waukesha, Wis.

Copies of this very complete Bulletin 185 on the subject of ready-mixed concrete plants may be secured direct from the manufacturer by mentioning this item.

...AND A *Two-Fisted Oil* TO HAUL IT!

"WEAK-SISTER" LUBRICANTS don't last long in a logging operation. That's why in the logging camps and sawmills of many of the world's largest lumber companies you'll find a preference for Shell Lubricants—they're tough!

The Weyerhaeuser Timber Company, Potlatch Forest, Inc., The Hammond Lumber Company, and many more, use Shell Diesel and gasoline engine oils, greases, and other lubricants, almost exclusively.

Not only in the lumber industry but in *every* kind of Diesel operation you'll find Shell Lubricants helping America lengthen the life of the engines and machines that must continue to deliver the goods on time.

Shell has lubricants to fit *your* needs, too. Have the Shell man tell you about them.

OIL IS *Ammunition* -USE IT WISELY

SHELL

SHELL *DIESEL* LUBRICANTS

For EVERY Use

Shattered Pavements Given a Longer Life

Program of Corrective and Preventive Mud-Jacking of Missouri Concrete Roads Broken by Traffic Pumping

(*Photos on pages* 1 *and* 60)

✦ AS one drives over sections of Missouri concrete roads on clay bases there is evidence of excessive cracking. Closer observation reveals that the flow of traffic has caused the water which has reached the subgrade through the joints to be forced out at the edges, resulting in a constant loss of the supporting base. Thus progressive cracking occurs in the direction of traffic. Corrective and preventive operations with Mud-Jacks were instituted in Division 8 in Missouri in 1937, following studies of the original work of John Poulter of the Koehring Co. and the work of the Illinois Division of Highways. These operations proved to be of such value that a statewide corrective program was started this past year.

The Problem

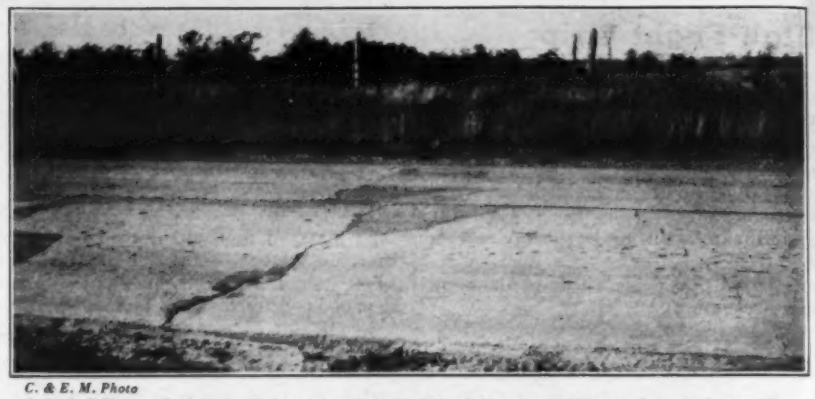
Although the ground was dry at the time of our inspection of the work being done on highways in Division 5 near Jefferson City, there was ample evidence that the clay subgrade had been washed out by the repeated forcing of water from beneath the slab out toward the shoulder or up through cracks that had been opened by earlier breaks or through the expansion joints that were not water-tight. The dry thin layer of mud on the pavement and the same appearance on the gravel shoulder was the conclusive evidence. We then watched the edges of the slab actually bend under the impact of heavily loaded coal trucks and other through traffic. One block of concrete that had broken badly under this action had been covered with an asphaltic top to try to hold it from complete breaking down. This section teetered under the weight of even light Ford trucks and small cars.

The problem faced by the Department is to stop this loss of subgrade material which, by process of attrition, is removing the support of the concrete slabs and permitting them to be broken by the action of traffic. The studies of John Poulter, shown so forcefully in the motion pictures first displayed at the Highway Research Board meeting of December, 1940, and the work of the Illinois Division of Highways, were taken as the basis of approach to the problem in Missouri. Mud-Jacking with a slurry that will not lift the pavement but which does completely fill the voids beneath the pavement and put a stop to the traffic's pumping base material from beneath the pavements was the result of the studies.

Extent of the Program

In order to secure the maximum amount of information, two members of the staff of the Missouri State Highway Department were sent to Illinois to study their methods first hand and to gather all possible ideas on ways to attack the problem in Missouri. O. I. Steele, Assistant State Maintenance Engineer, and P. G. Parrish, Division Maintenance Engineer, Joplin, were chosen to make the studies of Illinois methods. The results of their observations have been put to the test in varying ways in a number of the divisions in Missouri.

Work is now under way in Division 3, Hannibal; Division 4, Kansas City; Division 5, Jefferson City; Division 6, Kirkwood, where two Mud-Jack outfits are working; Division 7, Joplin; and Division 8, Springfield. At the start of the work in Division 5, every crack for the first 3 miles east of Columbia was pumped as a preventive measure, whether the pavement had failed or not.



C. & E. M. Photo

A bad failure of pavement due to pumping out of the supporting subgrade by traffic, indicated in the foreground, and a temporary repair of broken pavement on the far side of the roadway.

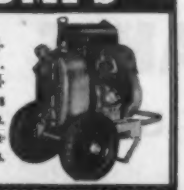
In those sections where the old concrete pavement had cracked and settled beyond any possibility of stabilizing the base by the use of the Mud-Jack, the adjacent sections were pumped with the Mud-Jack to stabilize them and to prepare for patching the damaged sections. One mile near Columbia is to be stabilized by slurry pumping and then surfaced with a road-mix to give a good riding surface and to seal the cracks in the concrete pavement. This surface will

(*Continued on page* 44)

STERLING PUMPS

BUILD FOR DEFENSE with STERLING PUMPS HOISTS and LIGHT PLANTS

Simple, Dependable, Rugged . . . the choice of leading contractors everywhere. Write for literature and prices.



STERLING MACHINERY CORP.
405-13 Southwest Blvd. Kansas City, Mo.

TACONITE MAY WIN THE WAR

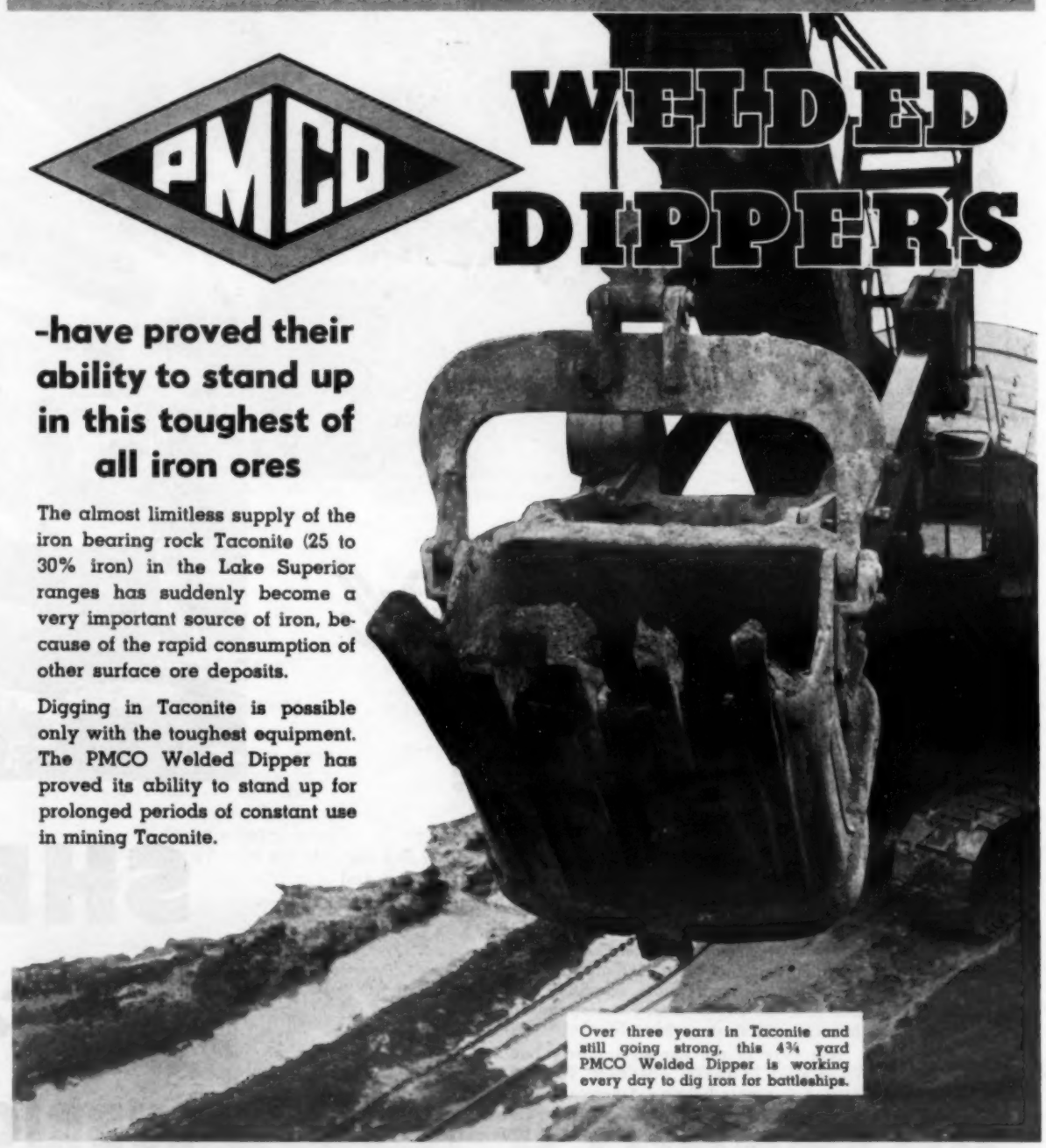
PMCO

WELDED DIPPERS

-have proved their ability to stand up in this toughest of all iron ores

The almost limitless supply of the iron bearing rock Taconite (25 to 30% iron) in the Lake Superior ranges has suddenly become a very important source of iron, because of the rapid consumption of other surface ore deposits.

Digging in Taconite is possible only with the toughest equipment. The PMCO Welded Dipper has proved its ability to stand up for prolonged periods of constant use in mining Taconite.



Over three years in Taconite and still going strong, this 4¾ yard PMCO Welded Dipper is working every day to dig iron for battleships.

We operate the largest and most complete manganese steel foundry in the United States

PETTIBONE MULLIKEN CORPORATION
Established 1880
4710 West Division Street, Chicago, Illinois

Equipment Dealers Praised by Galvin

(*Continued from page* 1)

and piece of construction equipment were called into service on projects vital to the war effort and ultimate victory. The construction machinery distributor played a large part in this mobilization for victory of contractors, equipment operators, service and maintenance men as well as manufacturers of equipment.

"The current war has been called a war of industries and no industry was better prepared or has acquitted itself more creditably than has the construction machinery industry. No small measure of credit for the high state of preparation of the industry is due to the distributor who for years has been both the first line of offense and defense for the manufacturer. It goes without saying that the services of distributors have been unselfishly volunteered to our Government wherever a need became known.

"It is a real pleasure to extend credit where credit is due and to pay this small tribute to those who constitute one of the strongest and most effective arms of the construction industry."

Mexico-Guatemala Bridge To Speed C-A Freight

The completion of an international bridge across the Suchiate River between Mexico and Guatemala provides an overland transport link from the United States through Mexico into Central America in time to be of service during the wartime shipping shortage. The structure was rushed to completion to improve American overland communications because of U-boat attacks on Western Hemisphere supply lines and diversion of ships to war tasks.

Engineers of the National Railways of Mexico started work on the bridge last August, and reached the Guatemala shore in less than eight weeks. When work began, railway freight had to be unloaded on the banks of the river and then ferried across. The bridge is nearly half a mile in length, cost about $80,000, and was built primarily for the emergency, with a minimum useful life of 16 years. A more permanent link is being planned for post-war use.

With the bridge in operation, overland transit between Mexico City and Guatemala will be practicable in 48 hours, according to an announcement by the National Railways of Mexico.

Maritime "M" Presented To Cooper-Bessemer Corp.

The Mount Vernon, Ohio, and Grove City, Pa., plants of the Cooper-Bessemer Corp. participated simultaneously in a single ceremony recently when the U. S. Maritime Commission paid tribute to the outstanding production achievement of the employees in both plants. The ceremony included the presentation of the Maritime "M", the Victory Fleet Flag, and a Maritime Merit Badge for each Cooper-Bessemer worker.

The Grove City plant has been supplying diesel engines at a record rate for United Nations cargo vessels, while the Mount Vernon plant has been producing cylinders, pistons and other parts for U. S. Liberty ships.

One of the posters used by John A. Roebling's Sons Co. to stimulate the regular purchase of War Bonds.

TARPAULINS
Shipped Immediately
NO PRIORITIES NECESSARY*

Now you can phone any of the Distributors listed at the right —order any of the tarpaulins in sizes and brands listed below— and, unless there has been an unusual demand for the particular item you specify—YOUR ORDER WILL BE SHIPPED IMMEDIATELY...

*This fortunate condition is due to the fact that a large stock of tarpaulins has been made up from released goods and is awaiting your call.

BEAVER BRAND EXTRA
7.50 OZ. BEFORE WATERPROOFING
16 OZ. AFTER WATERPROOFING

STOCK SIZES	
6 x 8	12 x 14
8 x 10	15 x 20
10 x 12	20 x 20

DEERSKIN BRAND EXTRA
10 OZ. BEFORE WATERPROOFING
18 OZ. AFTER WATERPROOFING

STOCK SIZES	
8 x 10	12 x 14
10 x 12	12 x 18
10 x 14	15 x 20
10 x 16	20 x 20

MULEHIDE BRAND EXTRA
12 OZ. BEFORE WATERPROOFING
20 OZ. AFTER WATERPROOFING

STOCK SIZES	
12 x 16	
14 x 16	18 x 24
15 x 20	20 x 20

ALL THE ABOVE BRANDS TREATED WITH GENUINE PARA WATERPROOFING

NATIONALLY AVAILABLE FOR IMMEDIATE SHIPMENT

For floor-by-floor protection on jobs like this, tarpaulins keep cold out, heat in.

For over-all protection, tarpaulins may be suspended from temporary framework.

Keep vital construction materials well protected. Avoid loss and costly delays.

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

ALABAMA
Owen-Richards Co., Birmingham
ARIZONA
O. S. Stapley Co., Phoenix
CALIFORNIA
Industrial Equipment Co., Oakland
CONNECTICUT
Gesner Equipment Corp., Hamden
DISTRICT OF COLUMBIA
Hudson Supply & Equipment Co., Washington, D. C.
ILLINOIS
Becker Equipment & Supply Co., Chicago
Joseph Behr & Sons, Rockford
Clark & Barlow Hardware Co., Chicago
INDIANA
Standard Equipment & Supply Co., Hammond
Van Camp Hardware & Iron Co., Indianapolis
IOWA
Harry Alter & Sons, Davenport
Pecaut Industrial Supply Co., Sioux City
LOUISIANA
C. T. Patterson Co., Inc., New Orleans
MARYLAND
General Supply & Equipment Co., Baltimore
MASSACHUSETTS
Hedge & Mattheis Co., Boston
Parker-Danner Co., Boston
MICHIGAN
Eddy & Cuthbert, Lansing
C. L. Gransden & Co., Detroit
MINNESOTA
Equipment Rental & Sales Corp., Minneapolis
Thorman W. Rosholt Co., Minneapolis
MISSISSIPPI
Contractors Material Co., Jackson
MISSOURI
Brown-Strauss Corp., Kansas City
Machinery & Supplies Co., Kansas City
The Victor L. Phillips Co., Kansas City
NEBRASKA
Anderson Equipment Co., Omaha
NEW JERSEY
Dale & Rankin, Inc., Newark
NEW MEXICO
Chas. Ilfeld Co., Albuquerque
NEW YORK
Keystone Builders Supply Co., Rochester
New & Used Equipment Co., Long Island
Syracuse Lumber Co., Syracuse
Trevor Corp., Buffalo
J. H. Welch Company, Inc., Buffalo
R. B. Wing & Son Corp., Albany
NORTH CAROLINA
Constructors Supply Company, Inc., Durham
Contractors Service Co., Charlotte
OHIO
Beck Supply Co., Columbus
Construction Equipment Corp., Cincinnati
Moriarty Machinery Co., Toledo
The W. T. Walsh Equipment Co., Cleveland
OKLAHOMA
The Victor L. Phillips Co., Oklahoma City
Mideke Supply Co., Oklahoma City
OREGON
Woodbury & Company, Portland
PENNSYLVANIA
Austin Supply Co., Philadelphia
Dravo-Doyle Co., Pittsburgh
Howard W. Read Corp., Philadelphia
VIRGINIA
Noland Company, Inc., Newport News
Benj. T. Crump Co., Inc., Richmond
WEST VIRGINIA
West Virginia Tractor Equipm't Co., Charleston
WISCONSIN
Hunter Tractor & Machinery Co., Milwaukee

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

H. WENZEL TENT & DUCK CO.
ST. LOUIS, MO.

YOUR GUARANTEE GENUINE PARA PURE PARAFFIN BASE WATERPROOF TREATMENT

C. & E. M. Photo
Type of concrete manhole cover being used by the Ohio Department of Highways with unreinforced-concrete catch basin slab replacing cast steel inlet lips and covers.

Substitute Material For Manhole Covers

A number of cities, counties and state highway departments have made various substitutions in the material used for manhole covers, following the WPB Order which barred the use of cast iron, thus saving about 500 pounds in a normal installation, 250 pounds in the lid and 250 pounds in the frame.

Among the first in the country to try out wooden manhole covers was Los Angeles County, Calif., where the covers were built of solid timbers bolted together and Wolmanized to resist termites and decay. Another type of cover eliminates the metal altogether by using glued-in wood dowels to bond the laminated wood. Wooden lids 2 feet 9 inches in diameter, built of 2 x 8-inch planking and weighing 130 pounds, have been constructed in both circular and hexagonal designs by laminating short lengths of planks. These covers may be built in local wood-working shops without extensive fabricating equipment. Tests show that these pressure-treated wooden covers have ample strength and durability.

In Ohio, the Department of Highways has been using precast concrete covers, as illustrated, on some of its access road work with outstanding success.

California Contractor Wins Army-Navy Award

We have reported in these pages the receipt of Army-Navy "E" Awards by a considerable number of manufacturers of construction equipment. We are very glad now to report an Army-Navy "E" Award to Barrett & Hilp, general contractor and member of the A.G.C., of San Francisco, Calif. The Award to this company, its associated subcontractors and employees was for an "outstanding performance in wartime construction at the Mare Island Navy Yard".

The Award was made at appropriate ceremonies at the Navy Yard on December 5, and that evening Frank Barrett and Harry Hilp of the contracting firm were hosts to the combined organizations at a celebration party.

In addition to the extensive operations at Mare Island, Barrett & Hilp are constructing a number of other war projects. The company recently completed 5,000 houses in 180 days near the Norfolk, Va., Navy Yard, this being reported to be the largest and fastest project of its kind in the history of construction. Another of its contributions to the Victory effort is its contract for concrete ships. Facilities for this operation were completed and the concrete poured for the first of these ship-shaped barges in December.

New Link-Belt President

Link-Belt Co., Chicago, Ill., manufacturer of materials-handling and power-transmitting equipment, has announced the election of William C. Carter as President of the company, to succeed Alfred Kauffmann who has resigned because of ill health. Mr. Carter, a graduate of the University of Illinois in mechanical engineering, joined the Link-Belt organization as a draftsman in 1902. He has held a number of positions in the company, serving as Vice President for the past fourteen years and for the past year as Executive Vice President.

Mr. Kauffmann, who has ably served the company for forty-one years, rising from draftsman in 1901 to President in 1924, is retiring from active service but will remain a member of the Board of Directors.

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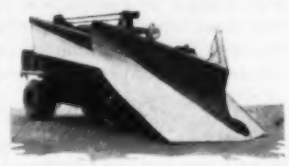

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War Birds in Alaska

TELSMITH

Portable Crushing-Screening Plants

★ Uncle Sam never leaves his war birds out on a limb — his planes must have bases—flying fields with runways, taxi strips and aprons.

They're being built — for defense in Alaska, for offense in Africa—all over the world. And much of the equipment that produces the aggregate for them is Telsmith built. And Telsmith knows how to build it. That's Telsmith's regular business, and has been *for years.*

Look at this Telsmith 36-A Portable Crushing-Screening Plant shown here in active service—helping to build flying fields for Uncle Sam's war birds in Alaska. You'd know the contractors, if we could mention the name.

It can be told, however, that this portable, like all Telsmith plants, is doing a consistently good job and doing it fast.

Although almost all current production of Telsmith Portable Plants, Telsmith Crushers and other equipment are going to Uncle Sam for use by the armed forces overseas—Telsmith Equipment is available for contractors doing war work. *Write for Bulletin P-34.* P-6

SOMEWHERE IN ALASKA — Handling hard, abrasive, volcanic gravel, this Telsmith 36-A Portable Crushing-Screening Plant is shown (*top*) making sand for airplane runways and landing strips. Sand capacity: 50 cu. yds. an hour; (*bottom*) producing 1¼" aggregate for base coarse at average rate of 100 cu. yds. hourly.

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Depot Floors Poured By Agitator Trucks

Large Areas of Concrete Floors for Quartermaster Warehouses Finished by Hand Labor, Power Floats

✦ IN spite of the difficulties encountered in the pouring of large areas of concrete floors in a series of 1,200 x 180-foot warehouses at a Quartermaster Depot in the Southwest, work was speeded to early completion. Areas of these dimensions would have been poured by standard concrete paving equipment in strips 20 feet wide except that columns 16 inches square protruded for half their dimensions into the slab area at each square, preventing the use of road paving methods. The expansion joints were inserted every 120 feet and the dummy joints at every square which was poured as a uniform 6-inch thick slab. Power grading and rolling of the 2 to 3-inch gravel cushion on both cut and fill sections speeded preparation for pouring, while the final finishing of the slab was accelerated by the use of four Whiteman steel troweling machines.

The contractor poured and finished an average of 29,600 square feet of floor per day for five days, working 8 hours a day with a fleet of 11 to 14 Jaeger and Rex truck mixers of 2 and 3-yard capacities, delivering 750 to 800 cubic yards of concrete. Originally planned to operate five days a week with an 8-hour day, the work day was increased to 10 to 14 hours and the work week to seven days to speed completion of the last two buildings which were badly needed for warehousing Quartermaster stores.

Preparing the Grade

The area in which the warehouses were constructed required considerable grading so that portions of the floors poured were on cut and the remainder on fill well compacted by rollers. Over this a mulch of 2 to 3 inches of gravel was placed for fine grading. A Huber industrial tractor with water in the tires and a blade between the wheels was used for the fine grading ahead of a large hand-labor crew. The final grade was rolled by a 5-ton Buffalo-Springfield tandem roller.

The forms for the concrete squares were 2 x 6-inch planks set to grade with 1-inch beveled keys on alternate forms to interlock the adjacent slabs. The warehouse floors were prepared for pouring by starting with the outside lane on either side. With nine lanes each 20 feet wide, the outer one on each side was poured first, then the next inner pair and so on until only the center lane remained to complete the floor.

The Joint Layout

The division of the floor into 20-foot square bays made the use of the 20-foot spacing for dummy joints a natural procedure, and the expansion joints at 120-foot intervals followed as logical design. The expansion joints consisted of ¾-inch premoulded joint material set across the entire width of the slab, and the same material was used around all columns and against the outside walls to isolate them from the action of the slab. No dowels were used in the expansion joints.

The dummy joints separating the 20-foot slabs were made by inserting a ⅛-inch steel plate ahead of pouring the concrete and held in place by a pair of 2 x 4's bolted across the top of the plate and with nine pins of deformed reinforcing steel driven through holes in the stiffeners and firmly into the grade. After the concrete had been poured, the steel plate was moved slightly to free it from the grout so that it could be removed easily by the hand finishers, leaving a thin slot which was later poured with a filler.

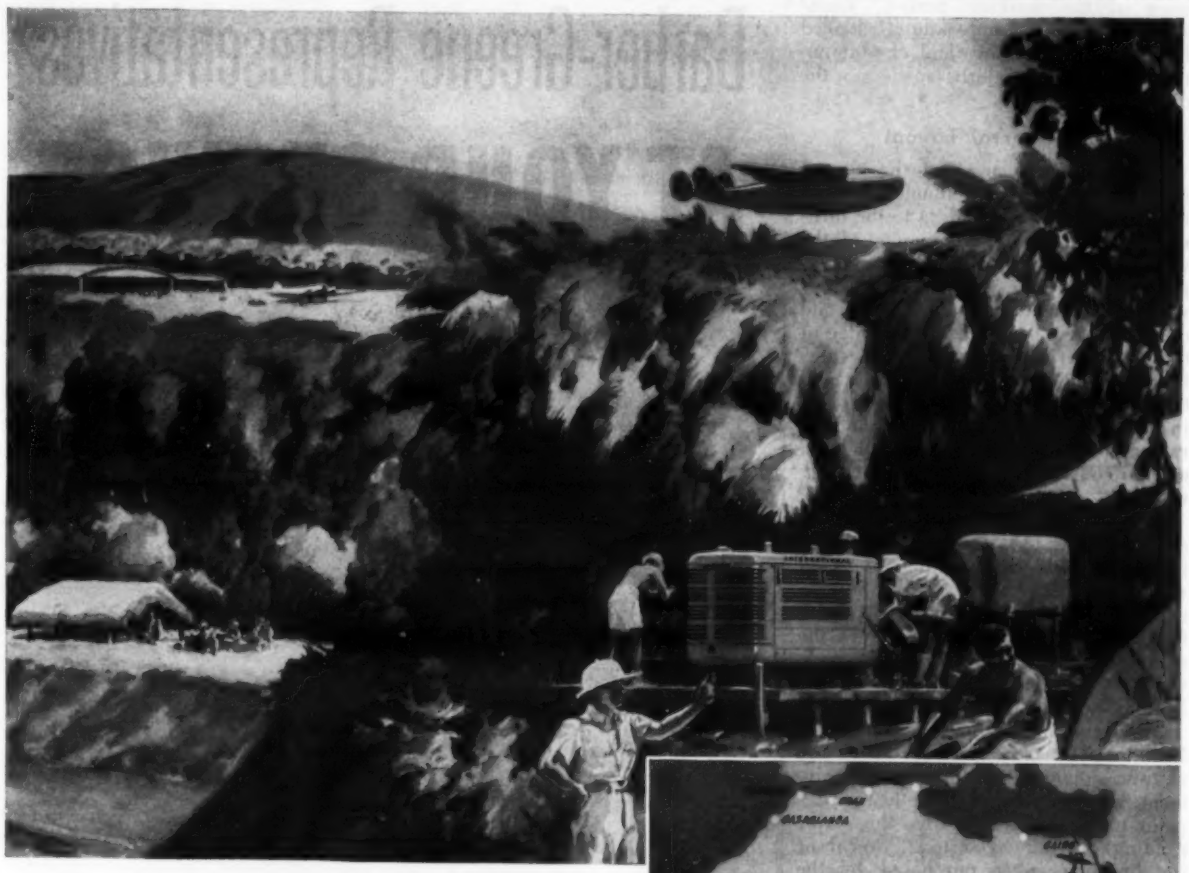
C. & E. M. Photo

Hand puddling and screeding were used for the floors at this Quartermaster Warehouse because interior column stubs broke up the area, making the use of a standard pavement finishing machine impossible.

Batching the Concrete

The batches for the floor concrete were weighed out at a commercial plant about 6½ miles from the reservation and hauled in 1 and 2-batch trucks to

(*Concluded on page 52*)



SKYWAY TO THE BATTLE FRONTS

International Diesel Power serves Pan American across Africa

Says an Executive of Pan American: "One might call the International Power Units the 'hearts' of our stations in Africa. We depend on the power from these plants for the lighting of buildings, shops and airports; the operation of pumps for the water supply systems; refrigeration of meats and other food supplies; electric ranges for cooking; ventilating fans; air conditioning units; laundry machinery; shop tools and equipment; the heating of water, and other miscellaneous uses."

"PLENTY AND ON TIME!" With breath-taking speed Pan American Airways built the now-famous South Atlantic and African aerial lifeline for the Air Transport Command. In just 61 days, on Presidential order, Pan American got this new trans-hemisphere transport service in action, with planes winging across a vast expanse of ocean, jungles, deserts.

Aboard the Clippers speeding out from American terminals are ever-mounting loads of war-vital men and materials for the fighting fronts in Africa, Russia, India, China and the South Pacific.

The forging of this chain of aerial bases to complete the routes across nearly 18,000 miles of land and sea will stand forever as an inspiring chapter in aviation history. With the expert authority of the Air Transport Command and the unstinted cooperation of manufacturers geared to war production, the job was swiftly done. The way lay clear to great events. *Here was a route destined to play hob with Axis strategy!*

International Harvester is proud of the part played by International Diesel Power units on the Pan American route to the Middle East and the Orient. On many another lifeline in the war, International Crawler Tractors, Power Units, and Motor Trucks speed the way to battle. Like all Harvester products, today they are *dedicated to Victory.*

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A 500-Acre Airport From a Dairy Farm

Well-Known Dairy in East Replaced by Large Airport, Contractors Move 35,000 Yards of Material Daily

(*Photos on page* 60)

ROLLING country, much under cultivation, and used for grazing a pure-bred herd of dairy cattle, was graded for a first-grade CAA airport between early June and the end of October, 1942. Many deep cuts consisting of approximately 40 per cent rock excavation, several high fills and a long 12 x 12-foot arched culvert were taken in stride by the associated contractors. A total of over 5,000,000 cubic yards of earth, rock and coal excavation was removed at the rate of nearly 35,000 yards a day during most of the working period. Large scrapers, bottom-dump wagons loaded by shovels, bottom and end-dump trucks, and Tournapulls made up the dirt-moving fleet.

The General Layout

Within the 500 acres of the airport are three runways each about 5,200 feet in length and corresponding to the three most favorable compass points of the wind rose for the nearest operating airport. The runways were graded 500 feet wide with the slopes daylighted and cleared 15 feet beyond the outer edge of the graded area. The runways, the paving of which is not included in the contract under discussion, will be 150 feet in width when completed. Each of the runways has an irregular original ground contour with deep cuts and high fills.

At the point where the 12 x 12-foot culvert crosses the NE-SW runway there is a 95-foot fill while the maximum cut was 80 feet. On the E-W runway the maximum fill is also over the 12 x 12-foot culvert and is 89 feet while the maximum cut is only 38 feet in rock. On the NW-SE runway the maximum cut is 46 feet and the highest fill 30 feet.

The large number of farm buildings, including barns, milking machinery and motors, creamery building and equipment, were all removed by other parties prior to June 1, 1942, when the major grading operations started. Several of the buildings were purchased by the associated contractors for use at the site during grading and then removed for their personal use elsewhere. Certain of the structures were used for the storage of parts, tires, lubricants, etc., and for a repair shop, although most of the repair work during the good summer weather was done outside. An existing house was used as an office for the contractors and another outside the construction area for the office of the Resident Engineer and his staff.

A careful study of the prospective operations led the contractors to decide to use scrapers for hauls up to 1,500 feet for earth and loose rock which could be loaded easily by scrapers with pushers after loosening by a ripper. Then Euclids with their bottom-dump feature and higher speeds took over the hauls from 1,500 to about 5,000 feet, the longest haul, for both earth and rock, and Tournapulls the earth work in the same range. The shovel and tractor units with the details of the hauling equipment will be covered below.

U. S. E. D. Photo

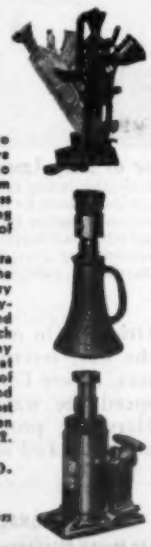
General view showing the dairy farm structures which were removed, and the site of a 95-foot fill over a 12 x 12-foot culvert.

The Arched Culvert

The major drainage structure in the contract was a 1,473-foot reinforced-concrete culvert 12 x 12 feet inside dimensions and with a 2-foot wall and arch. The total height of the culvert is 16 feet 6 inches, of which 3 feet is the invert with a flat V to concentrate low flows at the center of the invert. The culvert is laid on grades of 0.773 and 0.704 per cent and is backfilled for a height of 8 feet 6 inches, to the spring line, with a 3-foot thick layer of gravel. In the construction of the culvert, the forms were made up in panels 10 feet long and assembled for 30-foot pours

(*Continued on page* 46)

MOBILIZE CONSTRUCTION MANPOWER



When there aren't enough men to go around, give those you have all the help you can. There's no better way than to supply them with plenty of jacks for the endless pushing, supporting, raising, lifting and lowering jobs that are part of every construction job.

Simplex Jacks provide that extra margin of safety that defeats the 6th Column — *Accidents*. Every jack in the line—lever, screw, hydraulic, geared and journal and push-pull jacks and Simplex trench braces—have not one—but many—exclusive safety features that have won the commendation of employers, workers, inspectors and insurance firms—and yet they cost no more than ordinary jacks; often less. See them all in Catalog 42.

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Better, Safer Construction Jacks Since 1899

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B-G representatives can be of valuable assistance to you during the present emergency. **PARTS** Many carry in stock the B-G repair parts most frequently required. Others can assist you in ordering parts. **MAINTENANCE** They will gladly advise you on general maintenance. Many are equipped to bring your machine in and completely overhaul it. **RENTAL** B-G representatives are glad to assist you in locating machines for rental or will assist you in renting a machine which you have idle. **ENGINEERING SERVICE** Your B-G representative will gladly give you the benefit of his experience in any proposed changes in your material handling layout. **NEW MACHINES** New Barber-Greenes are not available except on very high priority. If you are planning a job which will carry such a priority, your B-G representative will give you every possible assistance.

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42-4

New Bulletin Display For Safety, War Posters

A new modern bulletin and poster-display cabinet, designed for use in exposed locations on the job as well as for interior use, has recently been announced by Mine Safety Appliances Co. Known as the M.S.A. Tell-Board, the unit is designed for better display of wartime, safety and morale posters, instructions and special messages. Sturdily constructed of non-critical materials, the Tell-Board's glass-front cabinet permits the change of bulletins and posters quickly and easily.

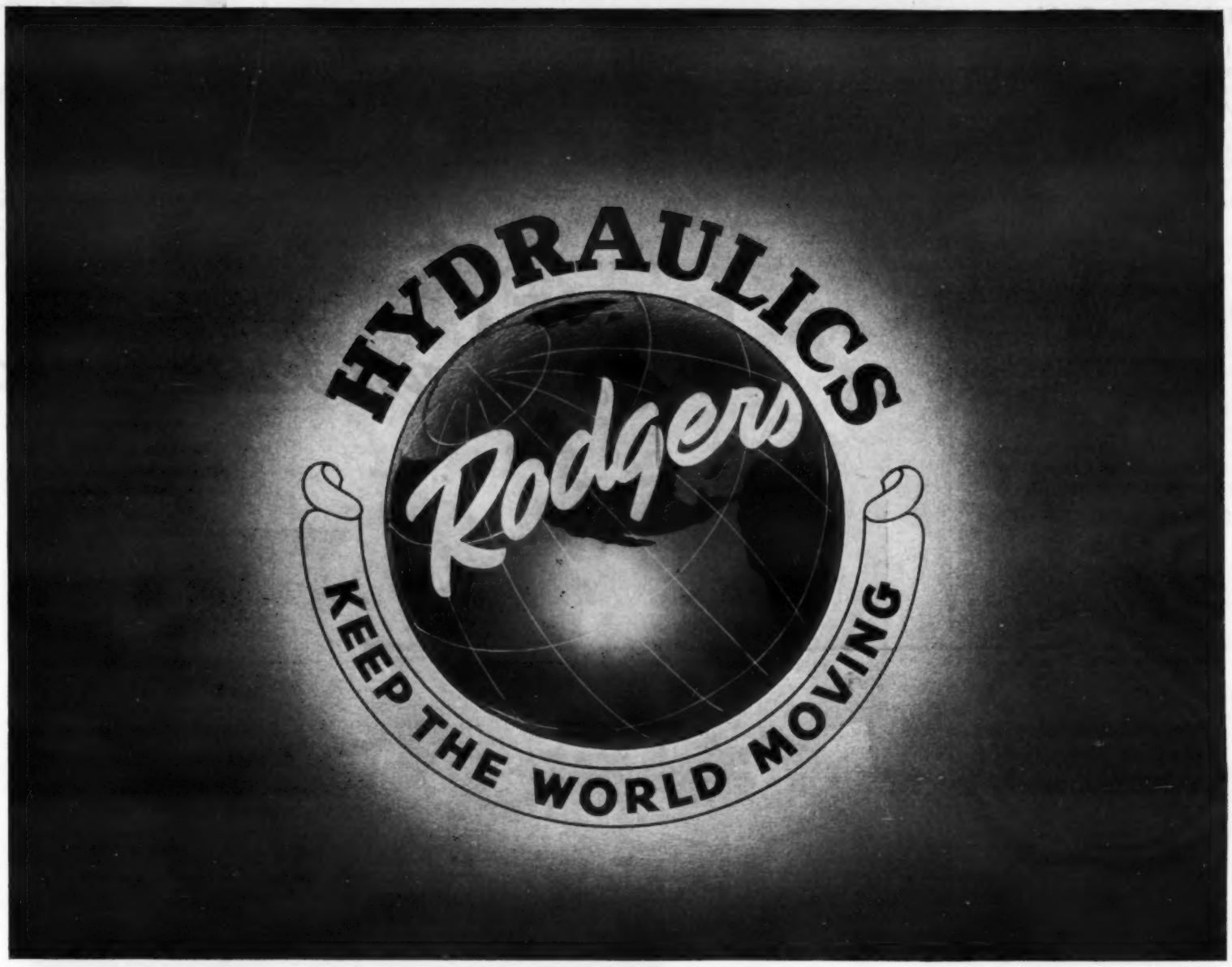
The Tell-Board is illuminated, equipped with a glass sign with sand-blasted letters reading "Safety Bulletins" or "General Bulletins", and measures 32 x 52 x 3½ inches. It is attractively finished in two-tone green enamel.

Further information on these M.S.A. Tell-Boards is contained in a new bulletin, CD-10, copies of which may be secured by contractors, state and county highway engineers, and safety engineers direct from the Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa., by mentioning this item.

Lighting Expert Dies

David S. Youngholm, Vice President of the Westinghouse Electric & Mfg. Co. in charge of the company's Lamp Division, died recently from a sudden heart attack, at the age of 53. During a career of more than 33 years with Westinghouse, Mr. Youngholm became a nationally known authority in the lighting field.

A native of New York, Mr. Youngholm joined the Westinghouse Lamp Co. in Bloomfield, N. J., immediately after leaving school, and served in various capacities there, becoming Vice President in 1936. He was a Director and Vice President of the Bryant Electric Co., Bridgeport, Conn., and was also a Director of the Westinghouse Electric Supply Co.



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ON FAR FLUNG BATTLE FRONTS, on the new Alaskan Highway, or a road construction job anywhere, Rodgers Hydraulics are doing their bit. ★ Wherever crawler type tractors tussle with heavy road building or construction jobs, Rodgers Hydraulic Track Presses furnish speedy repair of vital track equipment. Wherever heavy machinery operates — automotive, construction, factory or power plant — Rodgers Universal Hydraulic Presses will do the job with speed, power, durability and safety. ★ *If it's a Rodgers, it's the best in Hydraulics.* Rodgers Hydraulic Inc., St. Louis Park, Minneapolis, Minnesota.

Rodgers HYDRAULIC Inc.

A Slice of the Snow Belt In Western Massachusetts

Interview with Engineers Of District 2 Brings Out Their Solution of Winter Maintenance Problems

✦ UNDER wartime conditions, the job of manning the snow-removal fleet in the northern states is more difficult than ever. An interview with C. B. Raymond, Acting District Engineer, and C. S. Tinkham, District Maintenance Engineer of District 2, Massachusetts Department of Public Works, at Greenfield, brought out many of the problems which all states are facing at present and some of the problems peculiar to this District.

The approximately 1,500 square miles of the District between the Connecticut, New Hampshire and Vermont borders are close to the Berkshire Hills, known for their heavy snowfall. Conditions vary so greatly in District 2 that rain may be falling in one section, a heavy sleet storm creating a traffic hazard in another, while some of the hill towns may have their roads completely blocked with snow and be calling for snow plows to open them.

Snow-Plowing Equipment

The equipment available for plowing on the 275 miles of state highways in District 2 is divided between heavy and light trucks. There are 21 large snow trucks, varying from 2½ to 10 tons, all having four-wheel drive and including FWD, Walter and Autocar trucks. These trucks are equipped with V-plows as well as wings. It has been found economical in western Massachusetts to plow with the wing down to the level of the roadway, thus extending the effectiveness of the plow and saving one truck which would be used to widen out this extra distance. There are also fifteen 1½-ton trucks, divided between Fords and Chevrolets, equipped with 8-foot blade plows.

The policy in Massachusetts is to have all equipment repairs for the four-wheel-drive trucks handled at the main shops in Boston, as facilities are available there for truck overhaul during the summer. Then on their return they are stored in heated garages scattered over the District. These garages must have doors over 10 feet in height to accommodate the large trucks.

Plowing Organization

In addition to the 275 miles of state roads, which the state plows, there are 30 miles of town roads, on which the towns do the work themselves, pay one-half of the cost, and the state pays the other half. In bad winters, some of the towns in the hills have borrowed state tractors for their plowing, and the town has paid all of the costs, except repairs to the machine.

The snow plows start out when there is about 2 inches of snowfall. Since the equipment is scattered over three counties, Franklin, Hampshire and Hampden, each foreman calls out the men in his own section. A foreman has charge of from 18 to 30 miles of highway, but the miles traveled in snow plowing is much greater because of repeated plowing. This year, because of the scarcity of men, there may be much dead-heading of the crews to get the equipment to different points.

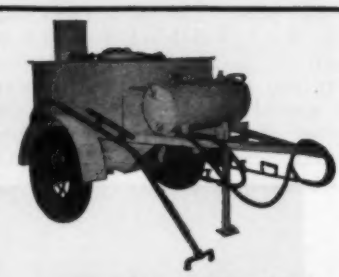
In District 2 there are twelve crews. The main roads are plowed first and then the secondary roads. Because of war conditions and scarcity of help it may require a longer time before the roads are opened this year. The District has been losing men from its crews continuously and expects that conditions will probably be worse before the winter is over. It is not possible to train a man in the summer to handle one of the big trucks when it is plowing. That has to be done under winter conditions.

Sanding Methods

Sanding is the greatest winter problem in western Massachusetts, as this operation requires extra help. It is difficult to drive on ice and handle the big trucks, so that with the loss of men there may be some necessary reduction in the amount of sanding this coming winter. This means that all automobile drivers here, as elsewhere, will have to be more careful in their driving and not operate as though they were on a dry road in midsummer.

All of the plowing equipment carries sand and is equipped with spinner-type

(*Concluded on page* 35)



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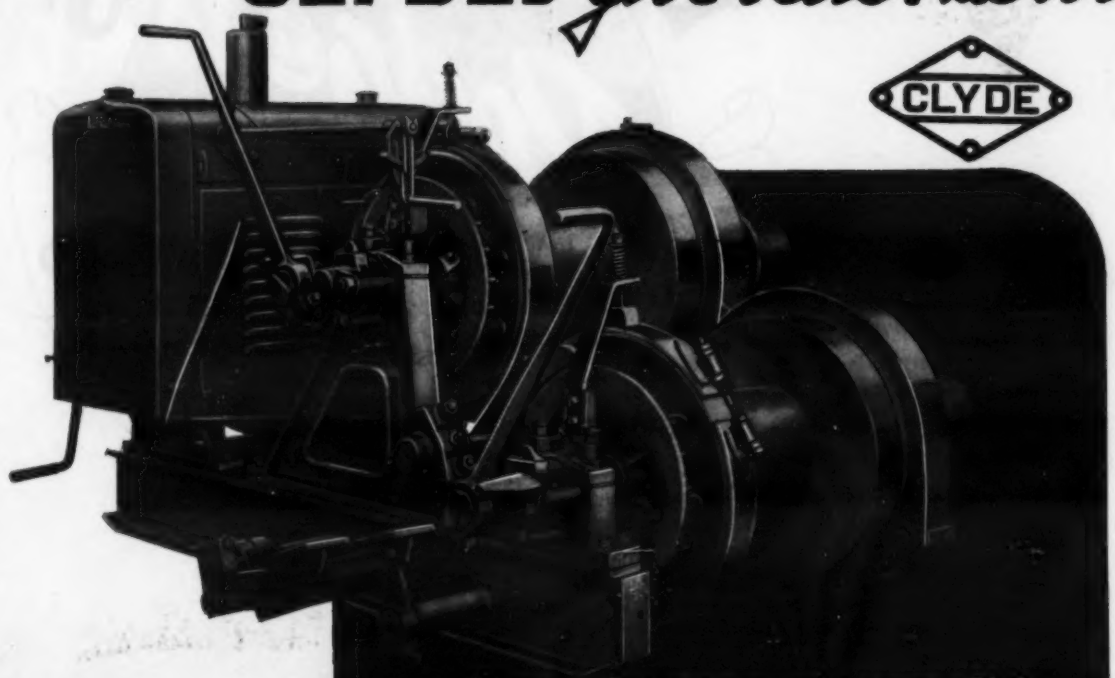

If you are fortunate enough to own a Clyde hoist, you know it is a husky machine built to give many years of top-notch performance. During these critical times extra care should be given it to help increase its efficiency and prolong its life.

Proper lubrication is very important to the life of any machine. A few minutes a day will reduce wear through friction and add years of service. If you do not have a lubrication bulletin that shows the proper lubricants and how to apply them, we will gladly send one.

Careful periodic adjustments of frictions, brakes and all wearing parts will also do much to give more efficient and satisfactory performance. Keep all bolts tight. Note parts subject to wear and replace, if necessary. Proper care of your hoist will keep it running.

CLYDE IRON WORKS, Inc.

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WON'T QUIT
or cause time out

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

The Hayward Company

32-36 Dey Street
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Hayward Buckets

New Culvert Design For Use in Wartime

(*Continued from page* 13)

driving the nails. Galvanized hardware and nails are not required. An 8 x 12-inch timber bolted down is used for a curb, and rails are eliminated.

A water seal is placed on the floor, consisting of two layers of 10/10-mesh cotton fabric and three coats of hot paving-grade asphalt with a penetration between 100 and 200. The hot asphalt is applied to the cleaned floor surface at a rate of 0.25 to 0.33 gallon per square yard, followed by alternate layers of the cotton fabric and asphalt, with the latter being applied at a rate of ⅛ gallon per square yard. A sand blotting course is applied on top at about 15 pounds per square yard. This may be pit-run material if of a satisfactory character. The asphalt is applied at a temperature of 275 degrees minimum. The blotting course prevents bleeding of the asphalt into the oil mat when spread and compacted over the structure.

Abutments and Piers

The abutment sections are semi-gravity with no reinforcing except as noted above for the heights above 4 feet. The front of the abutments is vertical and the back slightly battered. The top of the abutment is 12 inches thick with a seat 6 inches wide for the timber deck and of a depth equal to the width of the decking lumber. Centered in the seat are ¾-inch x 1-foot 9-inch swedged anchor bolts at about 2-foot centers. These are also used at the piers but are omitted on single-span structures. The space between the face of the seat and the ends of the deck timber is filled with 1:3 mortar immediately after the deck is placed on all structures.

The piers are merely standard 10-inch walls with the dowels used between the footing and the pier in all construction over 4 feet in height. If required to prevent scour around the piers and abutments, the area beneath the structure is paved with 6 inches of plain concrete with the center dropped 3 inches below the sides to form an invert. Little trouble has been experienced with this type of structure in collecting trash as they seem to be self-cleaning with the flows carried by the streams in the short periods of rain.

Personnel

The new standards for culverts are the product of the Bridge Division of the Arizona Highway Department, R. A. Hoffman, Bridge Engineer, and W. R. Hutchins, State Highway Engineer. State and county engineers interested in further details of these wartime culverts may secure prints of the Arizona standard sheet by writing to the Arizona Highway Department at Phoenix and referring to this article.

A completed 6 x 5 timber-deck culvert in service on an Arizona highway.

New Gorman-Rupp Factory

Announcement has been received that Gorman-Rupp Co., Mansfield, Ohio, has acquired a new and enlarged factory and office quarters. One of the new buildings is of the monitor type, 120 feet wide x 400 feet long, adjacent to which is another 2-story building 60 x 100 feet of brick construction, and connected to the factory building by an overhead covered bridge. The second floor of this building is used for the office, while the first floor is used for experimental and research purposes. The new buildings have a total of 60,000 square feet of floor space, of which 48,000 square feet is on one floor of the factory building.

The buildings are served by a railroad track entering the middle of one building and extending for approximately 200 feet, and a railroad siding extending the entire length of the building.

Seal Coating for Roads, Runways and Surfaces

Among the various Jennite products for sealing and protecting surfaces of metal, wood, concrete and mastic against the ravages of weather and decay is Jennite Koat, which is designed particularly as a seal coat for concrete pavement, parking areas, airport runways and concrete floors in warehouses, arsenals, hangars, and garages. It is easily applied as a paint.

In a 4-page folder, "The Facts and the Fables", the various uses of Jennite products are discussed, with information on the types of Jennite and the specific uses of each. Copies of this folder may be secured by interested contractors and Federal, state and county engineers direct from Maintenance, Inc., Wooster, Ohio, by referring to this brief review, or from CONTRACTORS AND ENGINEERS MONTHLY.

A SALUTE to the Nation's War Effort
★ Since Pearl Harbor, our Nation has amazed the world with its speedy transition to war production. Today its tanks, ships, planes and guns, as well as its fighting men, are dealing telling blows on every far-flung fighting front. Marion salutes the Nation's war effort and is proud of the part it is playing in the production of vital raw materials and the construction of war plants. Victory is bound to be the reward of such determined effort.
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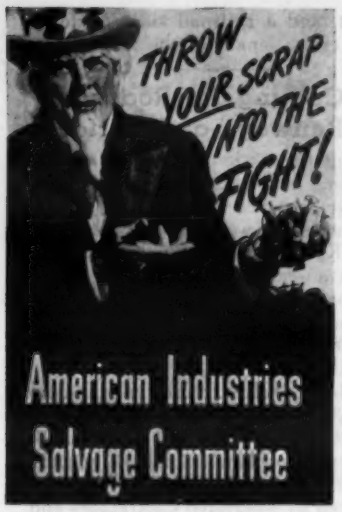
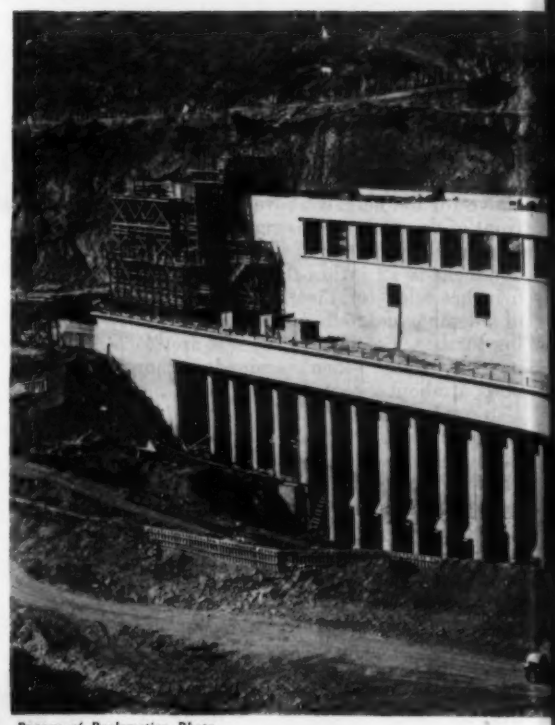


RAILROAD. At right, a scene in the construction of the Haifa-Tripoli Railway along the coast of North Africa. A Caterpillar with a LeTourneau bulldozer is spreading earth and rock fill for a tunnel approach. *British Official Photo*

CHINESE WELDERS. A group of Chinese welders at the Western Pipe & Steel Co., San Francisco, Calif. Under the leadership of Bill Jow, a graduate of the University of California and also a skilled welder, this group of 20 Chinese quickly developed into a group of experts. By means of recording instruments on some of the Lincoln arc welding machines which they use, competitive spirit was aroused among the crew members who enjoy checking on each others' performances. Two additional all-Chinese welding crews have been formed in this company, with the competitive spirit between the crews contributing to the quantity and quality of the work.

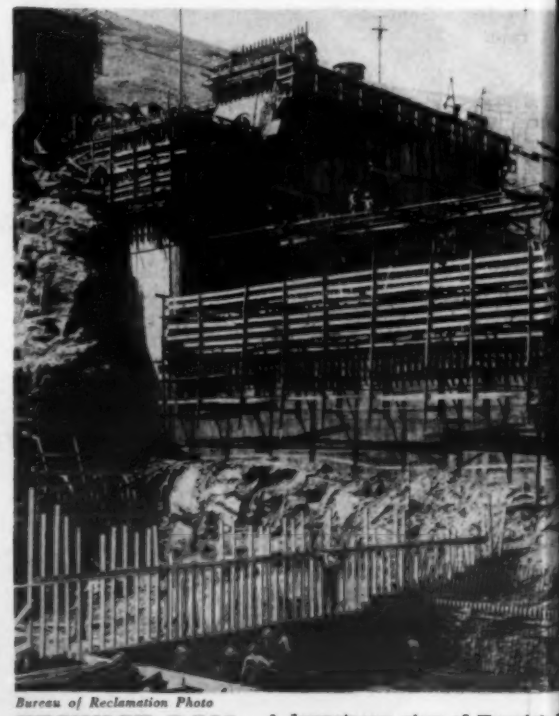
HANDY. An ingenious skid mounted on caster wheels and equipped with a Hobb hand hoist for lifting and transporting heavy structural timber used in the construction of a large warehouse at an Army Quartermaster Depot in the southwest. This is one of many devices which have been developed by contractors and members of their organizations to speed up work on war construction projects, thus contributing to the remarkable achievements of the industry in building for Victory.
C. & E. M. Photo

SEABEES, the Navy's Construction Battalion, building a cofferdam for a concrete ramp to be used for launching seaplanes on an island in the South Pacific. The cofferdam was made of planking, unwatered by two pumps and then backfilled with earth. *Official U. S. Navy Photo*



Bureau of Reclamation Photo

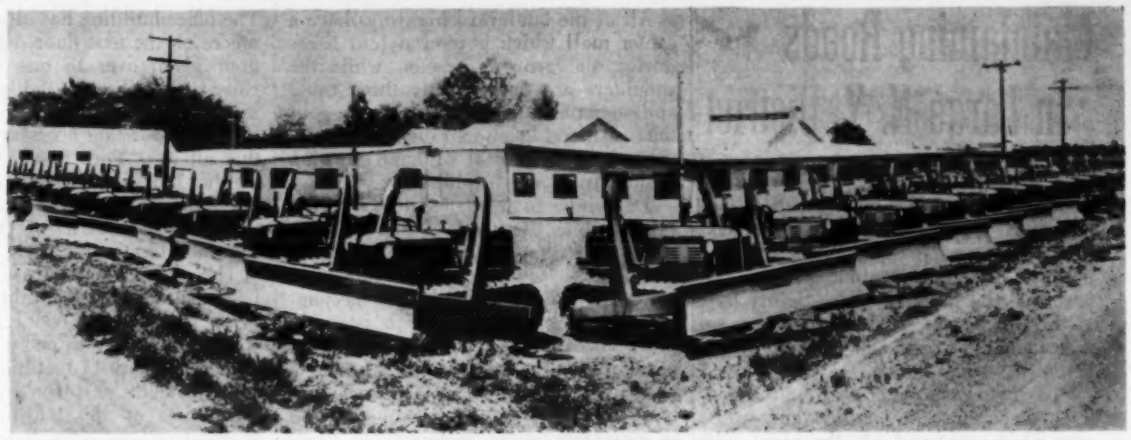
POWER HOUSE. The power house at Shasta [illegible] block mate capacity of 375,000 kil[illegible] gener 150,000 kw "on the line" by January, 1944, to help relieve [illegible]g pow



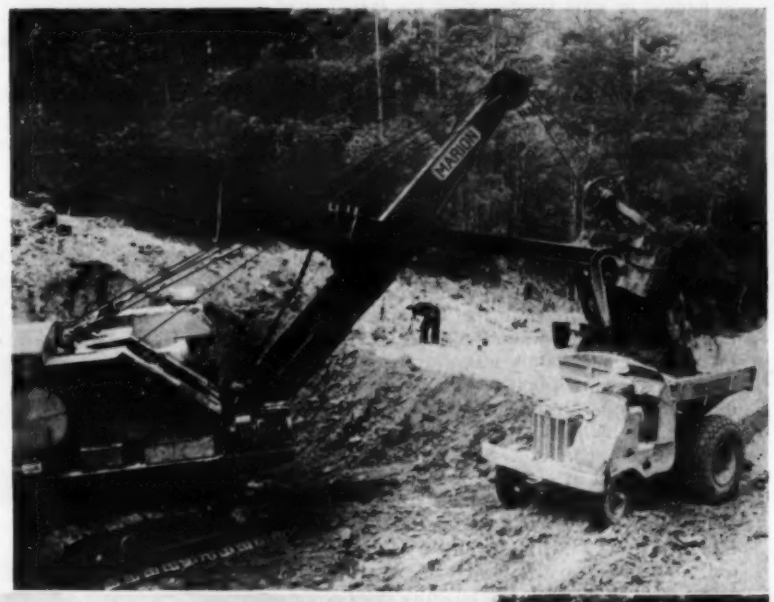
Bureau of Reclamation Photo

KESWICK DAM. A downstream view of Keswick [illegible] on the Sacramento River in [illegible] fornia, on which work is continuing under a WPB permit. [illegible]IPE such

hotos Stories



FIRE ENGINES of a new type. This line-up of Allis-Chalmers diesel-powered tractors with Baker bulldozers has been assembled as part of the California Division of Forestry's timber fire-fighting equipment. With the conservation of our natural resources more important than ever before, and the danger of forest fires on the West Coast increased by the threat of incendiary bombs from Jap planes, this troop of fire fighters will be distributed to vital points in California's timberlands.



TRANS-ISTHMIAN. Below, part of a fleet of White Half-Tracs on a completed section of the Trans-Isthmian Highway in Panama. These and other mechanized units recently made a trial run across the Isthmus, partly on the new road and partly through dirt and mud, in less than 3 hours. The trip will take only slightly over an hour when the highway is finished. At right, grading operations on a section of the highway.

…asta … block long and seven stories high, will have an ulti-…0 kilo… generating units now are being installed to bring …elieve… power demand in central and southern California.

IPE LINE. A Trackson pipe layer mounted on a Caterpillar diesel tractor, one of a fleet of such units placing 8-inch gas line in Oklahoma.

British Official Photo

TRAINING Royal Engineers in the use of tractors to construct anti-tank traps and aerodromes. Here an officer directs the operator of a Caterpillar diesel tractor and bulldozer.

Maintaining Roads In Large N. Y. District

(*Continued from page* 18)

treated about every third year. A light asphaltic oil, New York State Specification 67, such as an MC-1 or an MC-2 is used, applying ½ gallon per square yard the first time and then slightly less as the soil becomes more impervious so that the final treatments are about ¼ gallon per square yard.

The plant-mix material is purchased by contract locally on bids and averages $5.00 per ton f.o.b. the plant. It is hauled in state trucks or by the contractor on a mile basis with a set price for all hauling up to 10 miles, then 10 to 25, 25 to 50, and over 50 miles. This plant-mix material, known as New York Specification Type 3, has the following composition:

35 per cent	⅜ to ¼-inch stone
37 per cent	¼ to #8-inch stone
20.2 per cent	#8 to 80-mesh material
0.8 per cent	hydrated lime
7.0 per cent	RC asphalt of which 1 per cent is naphtha

The 7 per cent asphalt is reduced to 6 per cent when the material is to be laid in hot weather and the 1 per cent naphtha is reduced when the material is to be laid immediately after mixing at the plant. This plant-mix is applied only at temperatures greater than 40 degrees Fahrenheit.

This same cold-mix has been used with sand instead of stone for paths in the parkways. With 1¼-inch stone it is used for a base when the material is laid with a 1½-inch base and a 1-inch top. The fine mix is used extensively in maintenance work for patching and a special mix has been developed for cold patching as an alternate for Colprovia.

The maintenance of the drainage system consists of cleaning out ditches and the care of leaching basins in the sandy soil. These basins fill up with silt and have to be cleaned by hand, using an A-frame, bucket and rope. The standard basins are 4 feet in diameter and about 10 feet deep, built of concrete building blocks with the usual holes in the blocks laid horizontally to increase the leaching area. A 30-inch diameter cast iron grate is set on the top of the basins to permit the water to flow in, and when it is removed one man can get into the basin to fill the bucket.

All of the boulevard highways have a center mall which is mowed four times during the growing season, while the shoulders are mowed only three times and sometimes only twice. Because of the considerable amount of landscaping, there is a great deal of hand mowing around trees and headwalls.

The winter maintenance item of sanding is done by hand casting and by spinners pulled behind trucks. When the sand is secured directly from sand banks and pits, it is loaded by mechanical means. The sand which is stockpiled has calcium chloride or salt placed in the pile at the rate of 60 to 80 pounds per cubic yard. When the trucks are loaded at the pits one bag of chloride is sprinkled on the material per truck load.

Office, Shop and Garages

A new site was donated to the state by the village of Babylon on which an L-shaped office building, a shop and a storage garage were completed and placed in service in December, 1940. The office building has all of the district offices on the first floor, with the second floor given over to one long drafting room. The shop is divided into a service shop, sign shop, parts storage and a signal shop made necessary by the fact that all New York State Department of Public Works districts are required to maintain the traffic lights on state highways in their districts. District 10 has 250 such lights.

The shop, which measures 50 x 120 feet, is built of cinder block with red brick facing and steel trusses for the slate roof. It is equipped with five roller-type steel doors 11 feet high and 11 feet wide inside the cast iron guards. At the south end of the building, which is heated from the office building through a shallow steam tunnel, is the machine shop with the following equipment: a service bench equipped with a grinder and buffer, vise, valve resurfacer, pin hone grinder, a carburetor test stand (which was made in the shop), a valve-spring tester, a connecting-rod aligner, a hydraulic connecting-rod straightener, and alongside a 16-inch x 10-foot South Bend lathe. Also included in the shop equipment are: an armature growler, an armature mica undercutter, a Weidenhoff battery charger and tester, a Kempsmith milling machine, a flexible shaft portable grinder on a caster stand, a Weaver mechanical hand press of 25 tons capacity, a 27-inch Canedy-Otto drill press, a Stiles brake punch, riveter and grinder, a power hacksaw, a post ¾-inch Cincinnati drill press and a ⅜-inch drill press of the same make. There is also an A-C spark-plug cleaner and a Champion spark-plug tester, and two cabinets of small hand tools in which is also kept a valve seat refacer.

In the main shop are a United Motors Commentator for checking the vacuum in the engine as well as for checking the coils, condensors and AVR electric check. There is also an Oxweld acetylene welding and cutting outfit and a General Electric arc welder.

A separate shop is set aside for the blacksmith with a forge, vise and anvil

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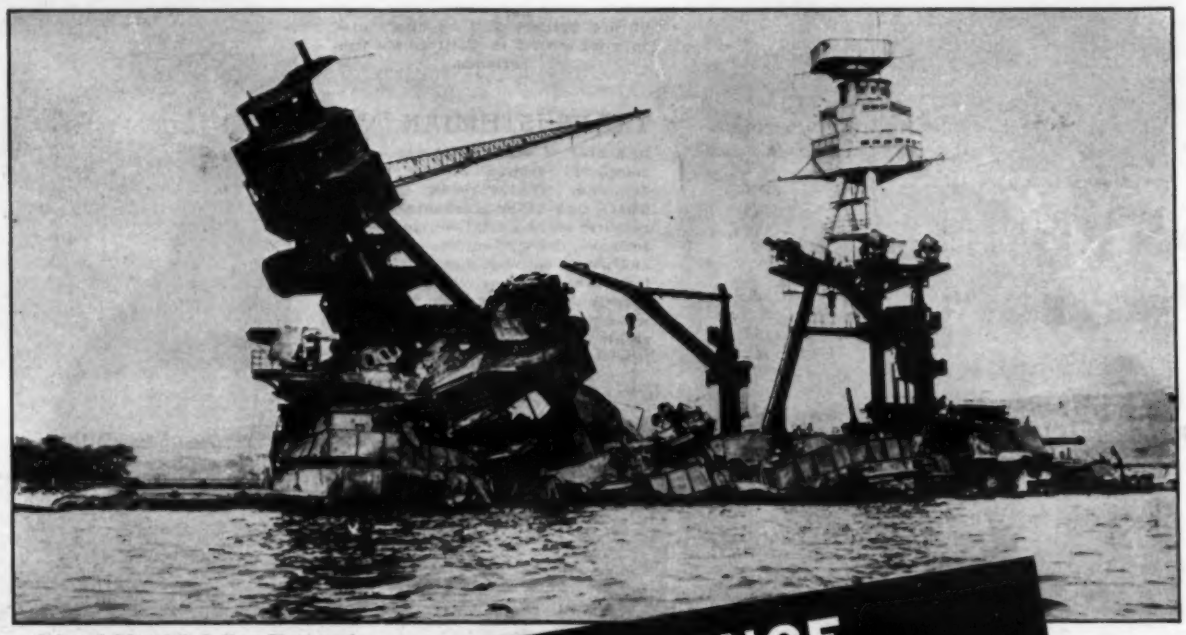

Released Official U. S. Navy Photograph.
U. S. S. Arizona in Pearl Harbor.

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Littleford Road Brooms sweep highways free of dust and dirt before the asphalt is applied. Littleford Brooms are made in Traction Driven or Power Driven Models.

"Spray Master" Pressure Distributor is the most modern spraying unit on the market today. It will handle Asphalt, Tar, Emulsion, Road Oil, or Cutback.

We have put our efforts to winning the war. We're in this struggle up to our necks and proud of the chance to do our part.

Needless to say, we are like most manufacturers—we cannot furnish equipment or parts without good reason. However, units now in the field doing important highway and airport construction or maintenance work can be helped through the Littleford Dealer Organization.

These Dealers have the facilities for repairing and servicing such Littleford units as Pressure Distributors, Supply Tanks and Road Brooms, Burners, etc. If they do not have parts in stock, we will try to do all in our power to supply them.

Remember, Littleford equipment is helping to win the war by keeping vital roads, airports, streets, etc., ready for action.

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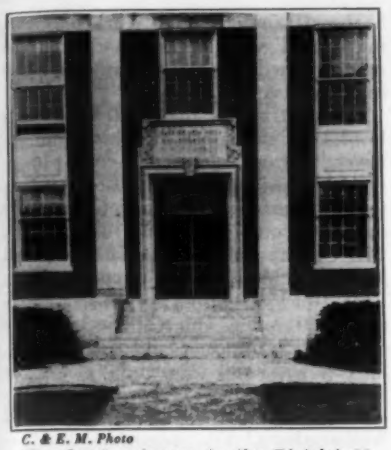

C. & E. M. Photo
The front entrance to the District 10 Office Building, New York State Department of Public Works.

Office and Garages In District 10, N. Y.

(*Continued from preceding page*)

and a special ventilator to take out the smoke and fumes. The main section of the shop is equipped with a grease pit, a pneumatic power greaser, a Bear wheel aligner, and a floor crane. Overhead is a 3-ton Wright traveling chain hoist which can be used to move heavy pieces of machinery and engines across the floor of the shop and also for handling metal signs and other material to the second floor as the monorail is extended through the wall to the second floor at the south end of the building. A heavy-duty hydraulic jack for raising trucks for greasing and servicing is on the main floor of the shop.

Along the main shop wall are six windows beneath which is a long bench illuminated on dark days and at night by five large electric lights with reflectors. A small room in the south section of the building contains a Worthington garage compressor and a number of bins for nuts and bolts. The main stockroom is on the second floor at the south end of the building. The oil room, where oil is dispensed directly from the shipping drums, is located on the ground floor. To complete the equipment of the ground floor section is a Fairbanks platform scale and an unusually large lavatory and shower bath.

On the second floor is a locked stockroom with seven sections of double bins with eight shelves in each bin and the shelves divided and given decimals to identify them so that any part can be located immediately by its bin, shelf and section number. There are also small metal bins for the storage of parts for carburetors, electrical equipment, parts for greasing, and reflector buttons. On the second floor also is located the sign shop where special direction signs are hand painted and where the standard state and Federal enameled metal signs are stored. The mechanical section of the garage is operated by a foreman with four men in the shop and such extra common labor as is needed. There are also two painters in the carpenter shop and one clerk who keeps the stock records. There are four unit heaters in the shop connected with the vapor-vacuum heating system.

In addition to the eleven-stall storage garage adjacent to the shop in Babylon, this district rents small local garages and two main garages, one just outside of Babylon where equipment and supplies are stored and another for similar purposes at Sayville. There are seven one or two-car garages scattered over the district for the storage of the maintenance equipment used by the local foremen.

The main storage garage devotes two stalls to the Electrical Department for signal storage and for the storage of the foreman's truck. These two stalls are separate from the four middle openings which are not equipped with doors and are used for open storage. Here for example is stored an unusual piece of equipment made at the shop, consisting of a 6 x 5-foot timber frame with Prestwood sheeting on four sides and the top and with a window in the front. This can be mounted on a truck by special clips and carries a 12-foot catwalk bolted to the top. This is swung out over parked cars in the built-up sections of the district when it is necessary to install or maintain route signs.

Two of the rolling doors at the north end of the shop give access to stalls used by the Electrical Department for repairing signals and the mezzanine for stock. In this section also are stored two Loadometers for truck weight studies and special portable traffic counters. The Electrical Department relamps the traffic signals on an average of four times a year. On traffic-controlled signals the main line lamps are changed more frequently.

The yard, adjacent to the shop and storage garage, is well screened by landscaping and contains some test concrete-block paving and a 12-foot wide ramp recently completed for loading mowers on trucks for quick haulage to distant parts of the district. Outside the office section of the shop is a gas pump, water and air lines for servicing equipment.

Equipment Roster

Each piece of equipment, including passenger automobiles, has an individual credit card so that it may be gassed out on the road when necessary. All equipment is initially fueled at the shop before leaving. The State Purchasing Department takes bids on gasoline and then the credit cards are issued in the name of the low bidder.

The equipment operated by District 10, New York State Department of Pub-

(*Concluded on page 59*)

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Special Equipment Movable Bridge Machinery

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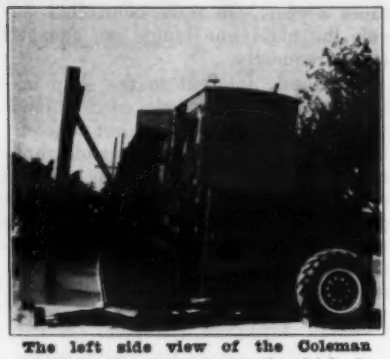

The left side view of the Coleman widener for snow removal which is towed behind a heavy-duty truck.

Widening the Road Through Snow Banks

The mere opening of a road through a high snow bank does not complete the job to insure continued safe traffic following the storm. Usually the first cut is made with a V-plow down the center through the deep snow. The high banks must then be moved back to permit plowing of later storms. The Coleman road widener is designed to get rid of this snow and not just shove it back as a hard wall of snow at the immediate edge of the traveled way.

The Coleman road-widening rotary snow plow is a self-powered trailer unit which picks up the snow sliced from the bank and flings it out to the side or into a truck to be hauled away. It operates efficiently in snow 4 feet deep in a strip 42 inches wide. Snow banks 12 feet high have been sliced down and removed in this manner with the widener plow traveling at 5 miles an hour and the rotary operating at 200 to 250 revolutions per minute. The rotor wheel and chute are reversible and can widen and throw the snow to either side of the road, or load it into trucks as conditions may require.

Complete information on this widening plow may be secured from the Coleman Motor Corp., Littleton, Colo., by mentioning this item. Coleman also manufactures complete rotary snow plows and heavy-duty all-wheel-drive trucks.

An Adjustable Cap For Setting Screeds

A new idea for speeding the setting of screeds for concrete floors of hangars, warehouses and factories, where the strike-off and finishing is to be done by hand, has been developed by Whiteman Mfg. Co., Department C, 3249 Casitas Ave., Los Angeles, Calif. These adjustable screed caps are made of malleable iron not likely to be broken up by driving, since a wood stake, usually a 2 x 2, is first driven and then the cap set at the proper height. Either a 2 x 4 or a 2½-inch pipe is set in the adjustable cap for use as a screed.

Among the real advantages of this cap is the fact that a stake of any length may be used, long stakes for soft ground and short stakes for hard ground, and even if the stake is disturbed it can be driven in further until solid and the cap itself readjusted to the proper elevation.

An illustrated folder on the Whiteman adjustable screed cap will be sent promptly to readers writing direct to the manufacturer and mentioning this illustrated text.

New Heil Branches

Announcement has been made by the Heil Co., Milwaukee, Wis., of larger and expanded service facilities in Detroit, Mich. The Heil Service Branch in that city is now located at 5743 Woodward Avenue, where it joined the facilities of Knorr-Maynard, Inc., in order to provide better service to Heil customers in that area.

Heil's Detroit Branch Office is now located in Suite 725, Fisher Building, which provides larger quarters and a more convenient location. Although the Heil Co. is at present producing primarily for Victory, the company believes that "preventive maintenance" is of major importance and for this reason is offering expanded service facilities in the hope that Heil customers will make good use of them in order to keep their equipment working for Victory.

New Nicaraguan Highway

The United States is planning to build a 175-mile highway in Nicaragua, linking that country's two coasts, according to an announcement of the Office of Co-ordinator of Inter-American Affairs. An agreement was recently signed whereby the United States will construct the road, connecting Bluefields on the Atlantic Coast with the Inter-American Highway and the Pacific Coast.

President Anastasio Somoza hails the highway as "The greatest undertaking in the history of Nicaragua".

Added Water Supply Facilities in Virginia

Rushing preparations for the construction of additional water-supply facilities in Virginia to provide water for the huge Seabees training camp which the Navy is building and to create a reserve supply of water for military bases and communities in that area, the Regional Office of the Federal Works Agency recently awarded contracts for work on two impounding dams, one across the Queen Creek at Waller Pond and the other across the Chickahominy River in New Kent County, which will create reservoirs having a total storage capacity of more than 4,000,000,000 gallons.

Michael Pontarelli & Sons of Chicago was given a cost-plus-a-fixed-fee contract for the Waller Pond Dam which will be of earth construction. This contract, which is estimated at $392,230, includes the clearing of approximately 600 acres of land, the construction of a spillway and the installation of pipe lines to the Seabees training camp. Work of clearing started early in December and the dam is scheduled to be finished in 129 calendar days.

The contract for the construction of a low-head dam across the Chickahominy River was awarded on a cost-plus-a-fixed-fee basis to the Boney Construction Co. of Norfolk, Va., and allows 120 days for completion. This dam, which will cost approximately $181,111, will be of pile and concrete construction, 1,500 feet long, with a crest 4 feet above mean low water. The work includes the construction of a fish ladder and a lock, 15 feet wide and 60 feet long, for the passage of small boats.

Newsom & Aldrich of New York and Williamsburg, Va., engineers for the Chickahominy River supply line, prepared the plans and specifications for the two dams.

Never has the proper care of equipment been so important. The machines you now have must last for the duration, so take care of them.

A WARTIME MESSAGE

To Highway Officials and Engineers!

THE same principles of wartime conservation, that civilians practice with their automobiles and tires, apply with equal urgency in the matter of the nation's highways.

This year's needs are not for pioneering new routes or building new cross-country highways, but rather for protecting and saving what we've got—for dependable and economical maintenance that will preserve the three million miles of existing roads that are the world's greatest highway system.

We Americans know from experience that poor roads save no one money. There is no calculating what they cost in excessive wear to tires and automobiles, in delays to vital transportation and in lost opportunities. They do not contribute to winning the war, and they have no place in America's victory program.

For these reasons, as well as to protect the investments in the roads themselves, highway engineers and road officials are advised to concentrate much of their efforts upon maintenance for 1943.

If your own budget seems inadequate for all it must accomplish, remember there is a right type Tarvia and a right Tarvia method for almost every type of highway maintenance and repair. The Tarvia field man, backed by Barrett's 37 years of paving experience, will be glad to suggest quick and economical ways Tarvia can be used to provide the most miles of good roads for wartime travel.

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Methods of Sanding Used on Mass. Roads

(*Continued from page 28*)

spreaders driven by a chain from the rear wheel. Sand is stockpiled along the road in the late summer and autumn, and there are some bins where the sand is protected from storms. In the stockpiles, as well as in the bins, about 100 pounds of chloride are added per cubic yard of sand. Salt is used mostly for this purpose, although calcium chloride is used some of the time. The sand is loaded quickly onto the trucks and spread whenever icy conditions occur on the highways.

Massachusetts has developed a method of applying the sand and salt to aid greatly in snow removal. The aggregates and chemical are applied about 8 feet wide down the center of the road ahead of plowing. The sand, aided by the salt, works down to the pavement and prevents wet snow from sticking to the pavement when it is packed down by traffic. This method was tried by one crew in District 2 and proved so popular that all of the crews took it up. Less sanding and less plowing have been required since this method became general practice.

Personnel

C. B. Raymond, Senior Civil Engineer, is Acting District Engineer of District 2, and C. S. Tinkham is District Maintenance Engineer, Massachusetts Department of Public Works, of which Raymond W. Coburn is Chief Engineer, and James E. Lawrence, Maintenance Engineer.

Safety Council Officers For Construction Section

The Construction Section of the National Safety Council has recently elected its officers for 1942-1943. W. A. Hazard, Bethlehem Steel Co., Bethlehem, Pa., is General Chairman of the Section and of the Executive Committee. Lloyd A. Blanchard, War Department, Washington, D.C., is Vice Chairman for Building Construction; G. W. Maxon, Maxon Construction Co., Dayton, Ohio, is Vice Chairman for Heavy Construction; Lester D. Wise, Pennsylvania Department of Highways, Harrisburg, Pa., is Vice Chairman for Highway Construction.

G. O. Griffin, Dravo Corp., Neville Island, Pittsburgh, Pa., is Secretary; and Edgar N. Goldstine, 232 30th Ave., San Francisco, Calif., is Editor of the *Construction News Letter*.

New Beckwith Treasurer

George N. Beckwith, Vice President of the Beckwith Machinery Co., Pittsburgh, Pa., has been elected also to the office of Treasurer. At a recent company meeting, the following officers were also reelected: J. S. Beckwith, President; E. G. Stoner, Senior Vice President and General Sales Manager; E. D. Townsend, Secretary; John H. Gunst, Assistant Treasurer and Assistant Secretary.

Get the most out of YOUR TRACTOR with

ADDING Buckeye Cable control to your tractor steps up its output two ways . . . first, you'll get higher output from your cable-controlled equipment with Buckeye's fast, accurate winch; second, your tractor can handle scores of new and *different* jobs with Buckeye's smooth, rugged cable power.

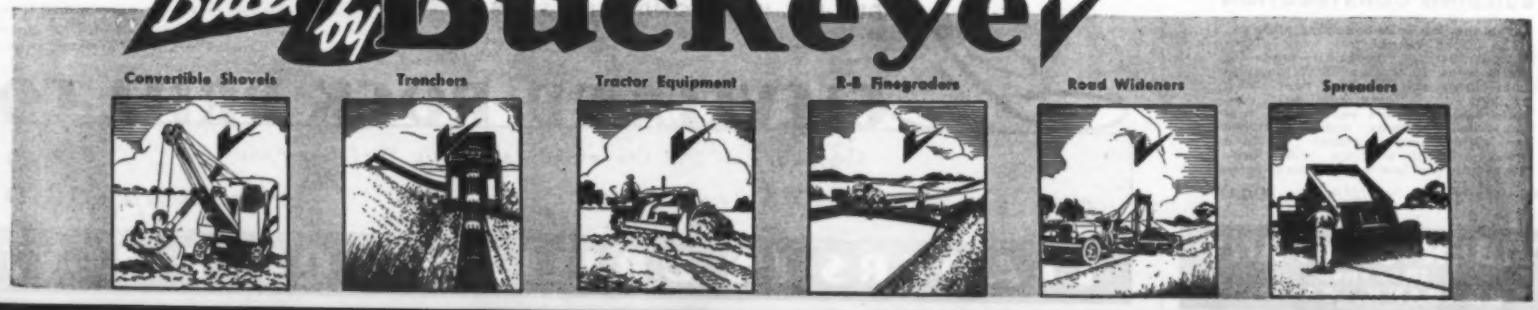
Using a two-drum Heavy-Duty Hoist, one drum can operate your dozer, ripper or scraper, leaving the second drum free to operate another piece of equipment or ready to handle the dozens of cable pulling, hoisting or hauling jobs that turn up on every project. Spooling 350 feet of ½" cable, the wide, husky Buckeye drum gives you over 8,000 lbs. line pull and a line speed of more than 300 ft. per minute. For hoisting jobs, your line can be reeved through single or multi-part sheaves—plenty of cable to work with, plenty of line pull for the tough ones. Simple job-made hoist frames can be mounted at the front, rear or sides of the tractor. Line may be run out directly from the drum to snake logs, pull out stalled equipment or pull cable, fencing, etc. To get the *most* out of your tractor, equip it with Buckeye Cable Control NOW!

Write for specifications on Buckeye winch models to fit your tractor . . . today.

THE BUCKEYE TRACTION DITCHER COMPANY
FINDLAY • OHIO

WITH BUCKEYE CABLE CONTROL, YOUR TRACTORS CAN DO MORE JOBS!

Built by Buckeye



C. & E. M. Photo

An Ingram pneumatic roller pulled by a Farmall tractor compacting stabilized base on the new San Antonio loop highway.

Base Stabilization For San Antonio Loop

(*Continued from page* 15)

ficiently to fill the moldboard on each trip, spreading the material as it progressed. By carrying the material in this manner, segregation, which would occur if the material were allowed to spill over the top of the moldboard, was prevented.

As soon as the entire windrow was broken out, providing the material for a 4-inch layer, sprinkling and compaction by an Ingram pneumatic-tire roller loaded to 45 pounds per square inch pressure was started. Best results from the contractor's standpoint were secured with the work laid out in 1,000-foot sections, as this amount would accommodate the equipment required without congestion and could readily be completed in one day's operation. Three to five tank trucks of 1,000 to 1,200-gallon capacity were used for the sprinkling, and two of the Ingram rollers, one pulled by a Farmall and the other by a John Deere tractor, for compacting.

The amount of moisture required for best results depends on the character of the material and the amount of fines. The ideal is to have just the amount of fines and sufficient water to cause the fines to coat the coarse material and then knead the layer to full compaction. Water on this job was secured from a creek, wells, and from the nearby city supply. Finish rolling was done by a 10-ton steel wheel roller to complete the flexible crushed limestone base.

Quantities

The major quantities involved in this $206,471.47 contract included:

Clearing and grubbing	43.56 acres
Excavation, earth, roadway	116,754 cubic yards
Excavation, earth, railroad	46,086 cubic yards
Excavation, rock	5,620 cubic yards
Excavation, channel	5,580 cubic yards
Excavation, structural	868 cubic yards
Stripping	4,700 cubic yards
Overhaul (660 feet free)	198,406 yard-¼ miles
Sprinkling	11,673 1,000-gallons
Rolling	2,525 hours
Scarifying existing pavement	44.9 stations
Flexible base	160,276 cubic yards
Additional ¼-mile haul	1,067,043 cubic yards
Prime coat, MC-1	1,039 gallons
Asphalt, OA-135	2,909 gallons
Aggregate	118 cubic yards
Class A concrete, culvert	985.11 cubic yards
Reinforcing steel	134,571 pounds
Reinforced-concrete pipe, 18-inch	294 feet
Reinforced-concrete pipe, 24-inch	231 feet
Extra-strength reinforced-concrete pipe, 24-inch	417 feet
Extra-strength reinforced-concrete pipe, 30-inch	66 feet
Block sodding	5,368 square yards
Spot sodding	47,199 square yards

Personnel

The contract for the grading, drainage structures and 12-inch flexible crushed limestone base was awarded to Dean Word, Contractor, San Antonio, Texas, for whom M. A. Cook was Superintendent. For the Texas Highway Department, B. C. Jenkins was Resident Engineer, and the work was done under the direction of Frank S. Maddox, District Engineer.

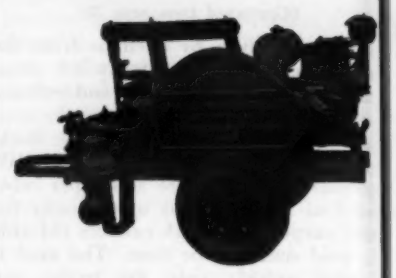
Avoid Winter Troubles

In a booklet entitled "Keep Ahead of Winter Troubles", there are a number of suggestions for contractors and engineers facing ice and snow problems.

This booklet, issued by the Hauck Mfg. Co., 124-136 Tenth St., Brooklyn, N. Y., describes Hauck concrete heaters, water heaters and salamanders for use on concreting and other winter construction jobs, while Hauck steam thawers are of particular interest to Army and Navy establishments, state and county highway departments, public utilities and others faced with delays, shut-downs or tie-ups due to frozen pipes, culverts and similar problems.

Copies of this booklet may be secured direct from Hauck.

4" Single Mud Hog Pump on Pneumatic Wheels



The "Old Reliable" Mud Hog brought up to date.

Gearing enclosed—running in oil.

All cut gearing.

Die-forged crankshaft in pump.

Available in the ball valve Force type, or the flat valve Open Discharge.

Send for Bulletin No. CEM-40-D.

MARLOW PUMPS RIDGEWOOD, NEW JERSEY

CLEVELAND CARTOONS tell how to keep rock drills *on the Job*

IT'S FREE write for a copy

THIS booklet of Cleveland Cartoons presents, in an amusing style, useful hints on proper rock drill maintenance. It tells you and your men what you can do to get more work out of your tools with minimum expense for repairs and compressed air. Your men will enjoy the practical, down-to-earth style of these cartoons. It covers many important phases of operation such as lubrication, dull drill steels, worn chucks, cleaning, etc.

We have already received requests for thousands of copies of Cleveland Cartoons. In the interests of efficient wartime operation, write *now* for your *free* copy.

BRANCH OFFICES

Birmingham, Ala.	Chicago, Ill.	Lexington, Ky.	Richmond, Va.
Berkeley, Calif.	Cincinnati, Ohio	Los Angeles, Calif.	Salt Lake City, Utah
Boston, Mass.	Dallas, Texas	Milwaukee, Wis.	St. Louis, Mo.
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CANADIAN DISTRIBUTORS

Purves E. Ritchie & Son, Ltd., 658 Hornby Street, Vancouver, B. C.
Whitehall Machine & Tools, Ltd., Galt, Ontario

BUY U. S. WAR BONDS AND STAMPS

A TYPICAL CLEVELAND CARTOON

DON'T USE DULL DRILL STEELS—When the bit, from wear or improper sharpening, loses its gauge, it will no longer be free in the hole and the blows of the hammer wedge it tightly, greatly slowing up, if not entirely stopping the progress of the drill. Never use dull steel. You get no drilling to speak of, and you put your machine in the repair shop besides.

The **CLEVELAND ROCK DRILL CO.**

Subsidiary of The Cleveland Pneumatic Tool Company

CABLE ADDRESS: "ROCKDRILL" • CLEVELAND, OHIO

LEADERS IN DRILLING EQUIPMENT

VIBER COMPANY CONCRETE

VIBRATION

MOST PROFITABLE FOR

REINFORCED CONCRETE BUILDING CONSTRUCTION

When the job calls for mass vibration—the Viber Vibrator at work above is your best bet. Especially made for walls over 10 inches thick, foundations, large girders, thick floor slabs, columns . . . large reinforced concrete bridges, grade separations, concrete floor systems, concrete arches and rigid frame structures . . . In a word, for all concrete with large aggregate and low water-cement ratio.

Write for complete VIBER data TODAY!

VIBER COMPANY
726 So. Flower
BURBANK, CALIF.

Somervell Praises Contractors' Work

The $10,000,000,000 construction program necessitated by the war is of fundamental importance to the Army, and the construction industry has done a magnificent job in executing the program with a speed never before approached, Lt.-Gen. Brehon B. Somervell, Commanding General, Services of Supply, U. S. Army, stated in the third program of the "Construction Goes to War" radio series sponsored by the Associated General Contractors of America.

The radio series points out the size of the construction program and its importance to the war effort, and is being broadcast throughout the country.

In a concluding statement, General Somervell said: "The accomplishments of the construction industry are of fundamental importance to the Services of Supply whose duty it is to see that every material need of the Army is met on time. The construction industry went to war more than two years ago. Today we look on it virtually as a branch of the Army and Navy.

"Were it not for the man with the hammer and the saw, the bulldozer and the dragline, the man with the gun would have had no place to receive the training he is now using to defeat the enemy. Were it not for the construction organization and their workmen, there would not be enough factories to make all the ammunition, guns, tanks and airplanes we need.

"Earlier this year in a letter to the Associated General Contractors of America, I took the opportunity to thank its members and all the fine people in the construction industry for the efficient and whole-hearted support they are giving the war effort. I am glad to repeat that statement."

New Washington Mgr. For B. F. Goodrich Co.

M. G. Huntington, who has been associated with the B. F. Goodrich Co., Akron, Ohio, since 1923, has been named Manager of the Washington Office of the National Sales and Service Division of that company. In his new capacity, Mr. Huntington succeeds K. D. Smith who assumes new company duties with headquarters in Detroit, Mich.

TRACKS—
BEAR THEM IN MIND

CUTTING OFF A WORN SPROCKET RIM WITH ACETYLENE TORCH

YOUR "Caterpillar" track-type Tractor gets much of its tremendous pulling power from the broad, steel-grousered tracks on which it runs. Barefooted, your tractor wouldn't be much good to you or the nation.

So in these days when every ounce of machine power counts for victory, you'll want to give special care and attention to tracks. There are many things you, yourself, can do to prolong the track life of your tractor. Here are some of them:

1. Keep the rollers, idlers and diagonal brace bearings lubricated. This should be done more frequently if your tractor operates in mud or water.
2. Keep the track tension correct, and the front idlers in alignment, so that wear will be evenly distributed.
3. Don't abuse the machine. A "Caterpillar" track-type Tractor is built to take a lot of punishment, but it will run longer if you avoid undue shocks and overloading.
4. Go over the nuts and bolts periodically to be sure they're tight. Look—and listen—for signs of wear.

When tracks are worn to the point of needing repair, your "Caterpillar" dealer is a past master at restoring their working efficiency. His excellent service facilities are available night and day, ready to:

1. Turn track pins and bushings. In some cases this will actually double track life.
2. Build up worn rollers by welding.
3. Build up the rail side of worn track links.
4. Weld new grousers on track shoes.
5. Cut off worn sprocket rims and weld on new rims.
6. Switch rollers, especially if your equipment puts extra load on the front, rear or one side of the tractor.

All these types of track service save metal — vital in today's war effort. Your "Caterpillar" dealer is carrying on a home-front war against waste. He's pledged to keep your "Caterpillar" equipment working with the least possible expenditure of war-needed materials. Call on him for counsel, service and repairs, and ask him for a copy of the useful new booklet, "Keep 'em Working." Your "Caterpillar" dealer is your partner and our partner in maintaining the efficient operation of "Caterpillar" equipment.

BUILDING UP TRACK SHOES WITH NEW GROUSERS

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY WAR SAVINGS BONDS!

Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

The High Cost of Mistakes

Every once in a while some poor chap walks through an open e.evator door under the mistaken belief that he is stepping into the elevator. There is no way whereby the mistake can be corrected.

Much more frequently a contractor's mind and his hand are traveling in different directions when he signs a contract. He will be lucky if his mistake happens to be a low-priced one.

A mistake in entering into a construction contract may take any one of many forms, but usually it involves signing the agreement without knowing just how the contract is worded, or without knowing just what difficulties are likely to be encountered in carrying out the terms of the undertaking.

Many have been the excuses presented in courts in efforts to avoid the binding legal effect of contracts signed "in haste and repented at leisure". Few of these excuses have been fruitful, unless the other party also participated in the mistake—in which case the mutual mistake would invalidate the agreement—or unless the other party was guilty of some species of fraud in inducing the signing of the papers.

Stop, Look or Listen

"If the signer could read the instrument, not to have read it was *gross* negligence; if he could not read it, not to procure it to be read was equally negligent; in either case the writing binds him." This statement of a general rule laid down by the Court of Appeals of New York was followed by one of the Federal district courts of that state in the case of United States v. Morley Construction Co., 17 Fed. Supp. 378.

"I didn't have my glasses with me," was one alibi offered in court for signing a contract without knowing that it was "loaded". The excuse was as futile as an attempt to excuse driving an automobile on a crowded highway in the nightime at 60 miles per, without the headlights turned on. (Hodge v. Milam, 171 S. E. 870, decided by the Georgia Court of Appeals.) Signing of the contract should have been held up until the bifocals were available, unless there was some one at hand on whom reliance could be placed to read the agreement out loud.

In a North Carolina case, a victim of his own mistake "alibied" his failure to read a contract before signing because he was "too busy" to read it. (Security Finance Co. v. McGaskill, 135 S. E. 450.) That excuse got no further than the plea of the Kentucky lad who, after being convicted of murdering both of his parents, asked the court to show him the mercy customarily shown to orphans. Judges do not recognize pressure of other business matters as a valid reason for neglecting the matter at hand.

Because construction contracts, like most other written agreements, are usually prepared in duplicate, it is interesting to note that there is at least one appellate court decision to the effect that one is not negligent in failing to read over both copies of a contract submitted for his signature. (Edward Thompson Co. v. Hunt, 218 Ill. App. 616.) Evidently Old Man Law feels that the signing party has a right to assume that the duplicate originals of a contract are worded alike.

Some Inexcusable Mistakes

One of the most common mistakes made by contractors results from errors in estimating quantities of work to be done, by inadvertently overlooking items, or in incorrectly striking totals of figures. The mistake ordinarily "pins" the contractor to the "mat" although he has agreed to do a job at a much lower figure than he would have agreed except for the mistake. But the courts hold that if the circumstances were such that the mistake was so glaring that the other party ought to have known that there was a mistake, he will not be permitted to take advantage of the contractor's error.

The Law presumes that every one understands the legal effect of agreements made by him. Therefore, the general rule is that one cannot escape the consequences of contracts made by him by showing that some quirk of the law raises a disadvantage. For example, if the Law says that street paving is payable only out of a special fund raised by special assessments against benefited property, the contractor cannot back out on the ground that he thought that general liability for payment of the contract price was imposed on the city. And, tough as it may seem, one cannot escape contractual obligations through a mistaken belief induced by erroneous advice received from an attorney.

A contractor is not entitled to be protected against the results of following *part* of the data furnished him as a basis for his bid and by ignoring the remainder of the data. It was so decided by the United States Circuit Court of Appeals in the recent case of Allied Bridge & Construction Co. v. Danville Sanitary District, 114 Fed. 2d, 155. In that case a sewer contractor was denied extra compensation on account of having encountered more underground water than was expected. It was found that the contractor's expectations were unwarranted because based upon an inspection of the site that ignored surface elevations shown by the plans. By adopting the invert elevations shown by the plans but ignoring the surface elevations shown thereby, the contractor erroneously assumed that the trench would be

(*Concluded on page* 41)

AMERICAN DeLuxe Concrete WHEELBARROWS

With Steel Wheel

for WAR ORDERS

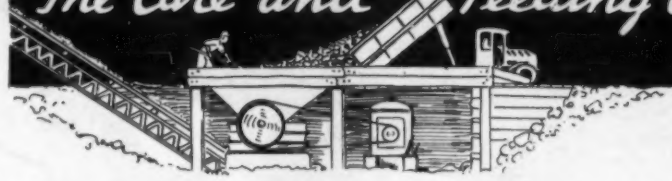
Write for Bulletin

American No. 1—4 cu. ft. struck capacity DeLuxe Concrete Wheelbarrow with steel wheel.

Code with steel wheel..... PERFECT-S

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

The Care and Feeding of Rock Crushers



No. 1 of a series of advertisements in the interests of national economy to aid users of crushing equipment unable to secure new units during the emergency.

Proper Feeding of Materials

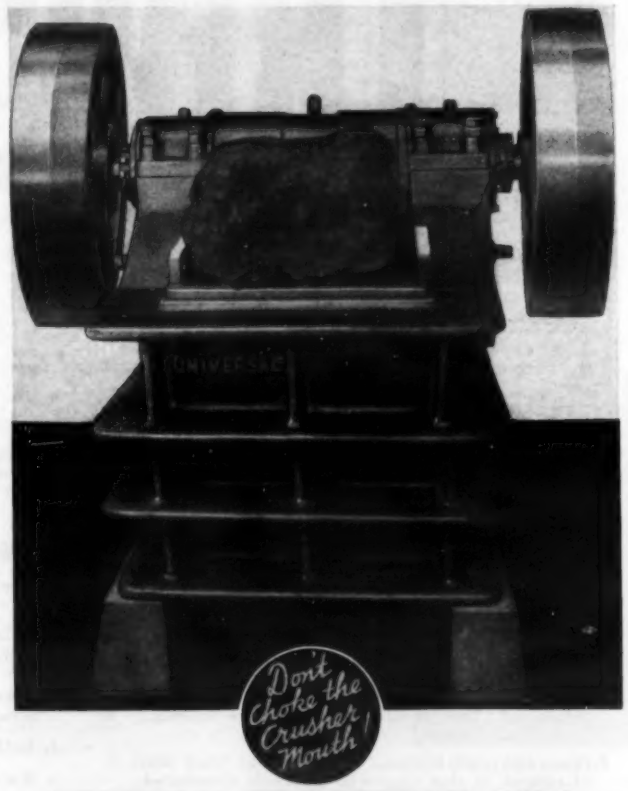
Avoid feeding stone that is too large for the crusher opening as it is certain to increase wear and cut production. As long as a large rock chokes the mouth of the crusher, no new material can be fed and an empty crusher is nonproductive. Avoid dumping directly into crusher mouth as big rocks may be in the load to choke and damage equipment and its removal is a slow, tedious job.

Don't ever use a sledge hammer to break a large rock in the crusher while it is running. An accident with the sledge might easily result in serious damage to the crusher. It is much safer to stop the crusher. Better still—be sure all rock is reduced to the proper size before bringing it up to the crusher.

Use a dump box or ramp for handling incoming material, feeding by rake or shovels and breaking pieces too large for feed by hand. Of course, an apron or conveyor feeder dumping onto a grizzly or screen is preferred because it provides a steady feed and allows for bypassing fines, lessening the amount of material going through the crusher, reducing wear and increasing plant capacity.

Removal of excess clay avoids packing of the crusher jaws and slippage. Removal of tramp iron in the field or on the conveyor avoids costly breakdowns.

Universal Crushers and Crushing Plants are built for long time trouble-free service—proper care and maintenance will greatly extend their useful service life.



UNIVERSAL ENGINEERING CORP.

Formerly the Universal Crusher Company

620 C Avenue West,

Cedar Rapids, Iowa

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

Sealtight

PRODUCTS

For Airport Runways, Taxiways, etc., and other Concrete Paving Projects

ASPHALT JOINT FIBRE JOINT

POURED JOINT FILLER

POURED JOINT SEALER

W. R. MEADOWS, INC.

ELGIN ILLINOIS

Asphalt Plant Set-Ups For Hot or Cold Mixes

The complete line of Simplicity asphalt plants, in a wide variety of types and styles to meet all job conditions, is described in an interesting 72-page catalog issued by the Simplicity System Co., Chattanooga, Tenn.

Beginning with a statement of the company's creed, the catalog continues with a description of the various units, driers, feeders, mixers, dust-collecting systems, burners, and storage tanks, photographs and descriptions of many Simplicity set-ups and a discussion of Simplicity asphalt-plant erection.

Copies of this catalog may be secured by interested contractors and Federal, state and county engineers direct from the manufacturer by referring to this magazine.

There is no better investment in the world than a share in freedom and peace. Buy War Bonds!

Transit-Level Catalogs

Surveying instruments, both new and rebuilt, are exceedingly scarce at the present time, but Warren-Knight Co., 136 N. 12th St., Philadelphia, Pa., has recently issued a catalog describing the line which it is able to deliver in from four to six weeks, depending on the model selected and the priority ratings furnished. Its factory is devoted 100 per cent to Government orders, but it is able to work on its regular line of instruments at infrequent intervals.

Warren-Knight has also issued a leaflet on the Novotni weight slide rule which is a valuable instrument for any one working in metals. These Novotni rules are made in Bakelite and therefore require a priority for delivery but the supply is ample.

Copies of the latest transit and level catalogs or of the slide rule folder will be furnished promptly to those requesting them and mentioning this item and publication.

Meet the faster construction demands of the

SOS

SERVICE OF SUPPLIES

You can depend on

Blaw-Knox

construction equipment

Get the vital construction jobs done quicker with dependable Blaw-Knox Construction Equipment.

Improved, up-to-the-minute design, sturdily built for round-the-clock operation; trouble-free service—all add up to peak performance.

Ask your nearest Blaw-Knox Distributor to tell you about this time saving equipment.

BLAW-KNOX

BLAW-KNOX DIVISION of Blaw-Knox Company
2067 Farmers Bank Building, Pittsburgh, Pa.
NEW YORK—Canadian Pacific Bldg. CHICAGO—Peoples Gas Bldg.
PHILADELPHIA—Broad Street Station Bldg. BIRMINGHAM—Brown-Marx Bldg.
WASHINGTON—Munsey Bldg.
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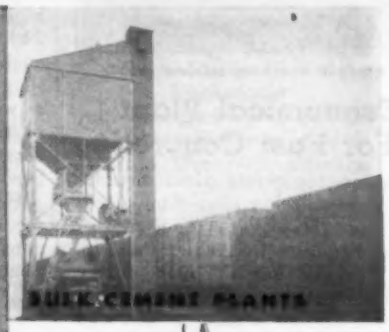
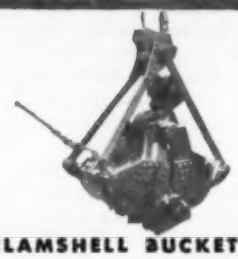
CONCRETE SPREADERS · ROAD FORMS · TRUCK MIXERS · CLAMSHELL BUCKETS · CONCRETE FINISHING MACHINES · BINS AND BATCHERS CONCRETE BUCKETS · STEEL STREET FORMS · BULK CEMENT PLANTS CENTRAL MIXING PLANTS · TRUCK TURNTABLES · TAMPING ROLLERS


BULK CEMENT PLANTS


CLAMSHELL BUCKETS

CONCRETE SPREADERS

AGGREGATE BATCHING PLANTS

ROAD FINISHING MACHINES

ROAD FORMS

CONCRETE BUCKETS

The Strayer concrete mixing plant.

An Economical Plant For Fast Concreting

A compact concrete plant mounted on an eight-wheel trailer for speedy moving from job to job is made by Erie Steel Construction Co., Erie, Pa. This Strayer Portable has a ¾-yard mixer, a 2 or 3-compartment storage bin which folds down for low headroom clearance in shipment, and a bucket elevator that raises material from the ground-level receiving hopper to a swivel chute for distribution to the bin compartments. This plant is also made with a 1-yard mixer.

Cement is emptied from bags into the cement hopper at waist level and is premixed with the dry aggregates by a feed screw which carries both into the ¾-yard mixer. It is said that the operator can weigh a batch of aggregates in 25 seconds, then he turns the valve to deliver the exact amount of water to the mixer. A foot lever discharges the AggreMeter gate and starts the screw feeder delivering cement and aggregates to the mixer. A batch meter controls the mixing time, signals the end of the mixing cycle, and unlocks the discharge spout of the mixer.

One user reports 165 yards of concrete produced in 7½ hours, another 1,200 yards in a week, and a third states that 30 minutes is all the time required to dismantle the plant to move and 60 minutes to set it up and be ready to pour. Bulletin S.C.P. 2-42 describes the plant in detail, shows it being towed and set up, and depicts the various operating parts in detail. Copies of this bulletin will be sent free upon request by the manufacturer.

New A-C Welding Booklet

Speed is increased 20 to 30 per cent and power costs cut one-third with the latest Flexarc a-c welders, according to a new booklet just issued by the Westinghouse Electric & Mfg. Co.

The complete line of Flexarc welders, with current ratings from 100 to 500 amperes, is described and illustrated in this new 12-page booklet. Featured are the 500-ampere industrial welder for high-speed continuous welding on all types of heavy construction, and the 300-ampere portable welder for heavy-duty work. Both models have built-in power-factor correction.

A copy of this booklet B-3136 may be secured from Dept. 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna.

Anchors and Accessories Bond New Concrete to Old

In its new 26-page booklet on American expansion bolts and anchors for bonding new concrete to old, hook inserts and J bolts, tie bars and other accessories for concrete road work, the American Expansion Bolt & Mfg. Co. calls particular attention to the service these accessories can render in enlarging, renovating and building aircraft runways, military highways and other concrete structures essential to the war.

It is stated that blasted runways and highways can be repaired in less than 24 hours with American expansion hook anchors and quick-setting cement. It is suggested that Army and Navy air bases as well as state and county highways departments should have a supply of these accessories on hand to meet any emergencies.

Copies of this new booklet may be secured direct from the American Expansion Bolt & Mfg. Co., 903-915 No. Spaulding Ave., Chicago, Ill.

GEERPRES Mop Wringer

DOUBLE STAGGERED GEARS CANNOT POSSIBLY SIDESLIP

Gear Shaft Size Increased—Will Not Warp Under Excessive Strains

Patent Pending

reduces mop costs from 25 to 50 per cent over other methods of wringing—retains the mop fabric in a soft fluffy condition most desirable for rapid mopping. No more loose mop strings to catch around legs of desks and furniture when using GEERPRES.

New construction makes this wringer last for many years. Made in two sizes, small size will wring mops 14 to 24 ounces inclusive, large size 20 to 36 ounces. Available with or without tanks. Send for free circulars and prices.

GEERPRES WRINGER, INC.

Manufacturers of High Grade Mopping Equipment

MUSKEGON, MICH.

SAND'S-STEVENS Line & Surface LEVEL

Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8531 Gratiot Ave. Detroit, Mich.

The Cleaver-Brooks Principle of Oil-Fired Steam Generation . . . Finds a Vitally Important Application in Equipment for Our Fighting Forces

Reproduction of photo-mural which is a composite illustration of various types of Cleaver-Brooks equipment built for our armed forces.

KNOWN for their efficient application of the multi-pass, down-draft heating principle, Oilbilt steam plants are providing steam for power and processing in hundreds of industrial establishments—helping them to meet record-breaking production schedules for war equipment.

Mobile equipment, employing the same proven principle of firing with America's ideal fuel—oil—and including hot water heating equipment, special steam generating plants, portable shower bath units, distilling, sterilizing and disinfecting equipment, is contributing to the safety and comfort of our fighting forces wherever they are located.

Now manufactured for a nation at war, Cleaver-Brooks products will resume their peacetime service when Victory day comes.

CLEAVER-BROOKS COMPANY

5110 North 33rd Street Milwaukee, Wisconsin

More Cleaver heating equipment is being produced than ever before—for military road and airport construction.

Construction projects, with a proper priority rating, can be speeded to completion with a Cleaver Tank Car Heater or Booster. Call or see your nearest Cleaver-Brooks representative.

CLEAVER-BROOKS COMPANY • MILWAUKEE, WISCONSIN

Costly Mistakes

(*Continued from page* 38)

shallower by about one foot than the plans showed. The court said: "If the bidder contractor had drilled a test boring of 10.5 feet inadvertently or intentionally and then had submitted his bid in reliance thereon, he would not have been entitled to extra compensation because in actual construction he was compelled to dig 11.5 feet as required by the plans and in so doing had found more water than his 10.5-foot test boring had indicated. We think that the plaintiff is in no better position in the instant case."

Conditions Misguessed

A common mistake made by contractors whose jobs involve delving underground concerns the nature of materials to be encountered in a tunnel or other excavation. Often a contractor expects Mother Nature to provide him with earth all along the way and she gives him rock. Assuming that the other party to the contract does not deceive the contractor concerning subterranean conditions and makes no guaranty concerning the same, the contractor ordinarily has a clear choice, when he bids for the contract, of determining the actual conditions by an exploration of the site—and that is what most bidding instructions virtually require him to do. Or he may insist upon provision for extra compensation in case certain underground conditions are encountered during the progress of the work. Or he can gamble on what Mother Nature has hidden under the shell of the earth at that point.

When a mistake involving serious consequences is discovered, the contractor should immediately secure competent legal advice before proceeding, in order that he may avoid being deemed to have waived some legal right by proceeding. In the light of such advice, he may find it important to give notice of a claim of cancellation of the contract, if ground for cancellation exists, or he may find it advisable to proceed under the contract, but give notice that extra compensation will be claimed. This is suggested by the decision reached by the United States District Court, First Circuit, in the case of City of Boston v. McGovern, 292 Fed. 705. In that case it was intimated that because the provisions of a tunnel construction contract indicated that the contractor had undertaken the risk of encountering ledge he was not entitled to cancel on encountering it. But any right that might have existed to cancel was decided to have been waived because after the ledge was discovered the contractor, instead of giving notice of cancellation, proceeded with the work under notice of intention to claim extra compensation.

Flexibility Important In Roadside Contracts

Under present conditions, particularly with many items becoming critical at unexpected times, it is well for state highway officials to keep contracts, such as for roadside work, as flexible as possible. H. J. Schnitzius, Landscape Supervisor, Indiana State Highway Commission, suggests that unit prices be sought on several extra items which might have to be used on a contract as substitute measures because of scarcity or the restricted income due to gas rationing.

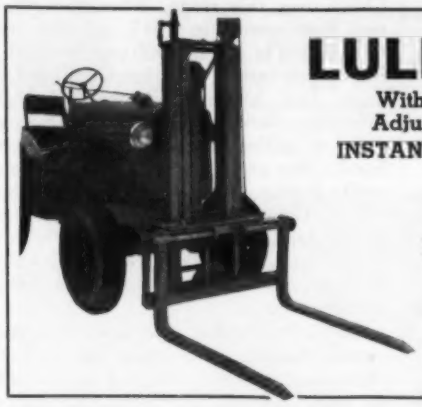
For example, sodding may have to be omitted on work where it is customarily employed because of cost, and seeding and mulching substituted. Another case in point is the use of straw as a mulch. Straw cost $5.50 a ton a little over a year ago, but today has risen to over $13.00 a ton because of the competitive buying of strawboard manufacturers supplying military needs. In this case, a "spare" item for weed mulch in the contract might save the day and prevent loss of time in negotiating a new work order at a mutually satisfactory price.

Concrete Products Plants

The various types of Besser equipment for concrete products plants, including batch mixers, both vibrator and tamper models of machines for the production of concrete blocks of all sizes and types are described and illustrated in literature of the Besser Mfg. Co., Alpena, Mich., which will be glad to send copies on request.

Grades of Paving Asphalt Restricted by Government

To provide additional residual fuel for war industries and to conserve transportation and storage facilities and manpower, Petroleum Coordinator for War Harold L. Ickes has called for a discontinuance of the use of slow-curing road oil and requested that the number of grades of petroleum asphalts and surfacing materials manufactured for paving purposes be reduced from approximately twenty-seven standard grades to seventeen. This action was asked in OPC Recommendation No. 61.



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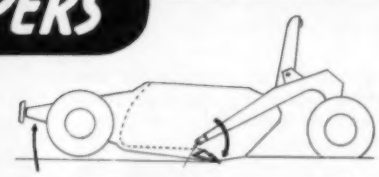

Draft pivot throws scraper weight on cutting bit . . .

The draft pivot point on the side of the bowl is *above and behind* the blade. A pull on the draft hitch therefore causes the bowl to tip up (see arrow at rear). The weight of the scraper then thrusts the blade *deep down* into the cut.

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Patent instant gear change and positive internal brake that never fails, and will lock load.

Gear Ratios	Weight	Price, f.o.b. Seattle
2-Ton 4, & 22 to 1	60 lb.	$ 50
5-Ton 4, & 24 to 1	110 lb.	$ 75
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The M.S.A. Comfo dust respirator with plastic filter containers.

Plastics Now Used In Respirator Cases

Primarily to save metals for war production, but also offering better appearance and less resistance to air flow, the filter cases of the M.S.A. Comfo dust respirator have been redesigned, using black plastic. The new filter container units are thinner, with rounded edges, permitting even better sideways and downward vision. These plastic filter cases also have high impact strength with no electrical conductivity and they are not affected by perspiration.

Further details will be found in Bulletin No. CR-9 which will be sent promptly upon request by Mine Safety Appliances Co., Braddock, Thomas & Meade Streets, Pittsburgh, Pa., to those mentioning this announcement.

Road Transportation Plays Big Role in War

The wisdom of a planned international highway system as a basic part of the war program has been dramatically exemplified by China's Burma Road, E. W. James, Chief, Inter-American Regional Office, Public Roads Administration, points out in a discussion of the Pan American Highway as a wartime key to inter-American transportation.

Scooped out in ten months by the back-breaking labor of more than 100,000 men, women and children, the Burma Road functioned for almost five years, pouring new life blood into the armies of China. Observers who have compared the Burma Road with finished sections of the Pan American Highway, such as those in Peru and other South American republics, rate the Burma Road as a back-country Grade D highway. Yet in 1941 the Burma Road managed to provide 20,000 tons of vital military and hospital supplies every month for the fighting Chinese armies, while other vital materials were exported by China over this route. When the road was first opened in 1937, its capacity was limited to about 5,000 tons a month. But despite lack of machinery and equipment, lack of organization, technical difficulties, lack of fuel, lack of surfacing and an unremitting rain of Japanese bombs, this artery continued to function until Burma was conquered by the enemy. Chinese humorists' favorite jibe at the Japs was that a Japanese bomb cost a thousand dollars; while the hole it made in the Burma road cost eight cents to repair!

The supplies that were routed to the valiant Russian armies from the port of Murmansk and then shipped southward by truck and rail have helped Russia to weather the terrific onslaught of the Nazi war machine. In the Middle Eastern theater of war, a combination of long-distance truck hauling over highways combined with rail and water shipping is being utilized to bring in supplies to bolster the Russian effort to hold the Caucasus oil region, thus further proving the necessity and feasibility of coordinated rail, ship and long-distance trucking under the impetus of military or strategic exigencies.

The "Fighting French" too built new highways, one about 1,700 and the other about 1,900 miles long, through French Equatorial Africa for the transportation of supplies for the Near East front, under very difficult conditions and at high costs. These highways enabled the "Fighting French" to attack the Axis in southern Libya.

Speed of vital road construction is exemplified by the Australian government which completed 600 miles of highway in 93 days, under very difficult circumstances, during the stress of its wartime emergency.

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Explains latest techniques, methods, equipment and materials. Complete book that'll pay you dividends. Order today.
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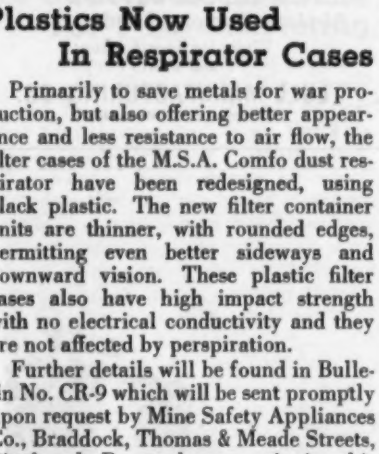

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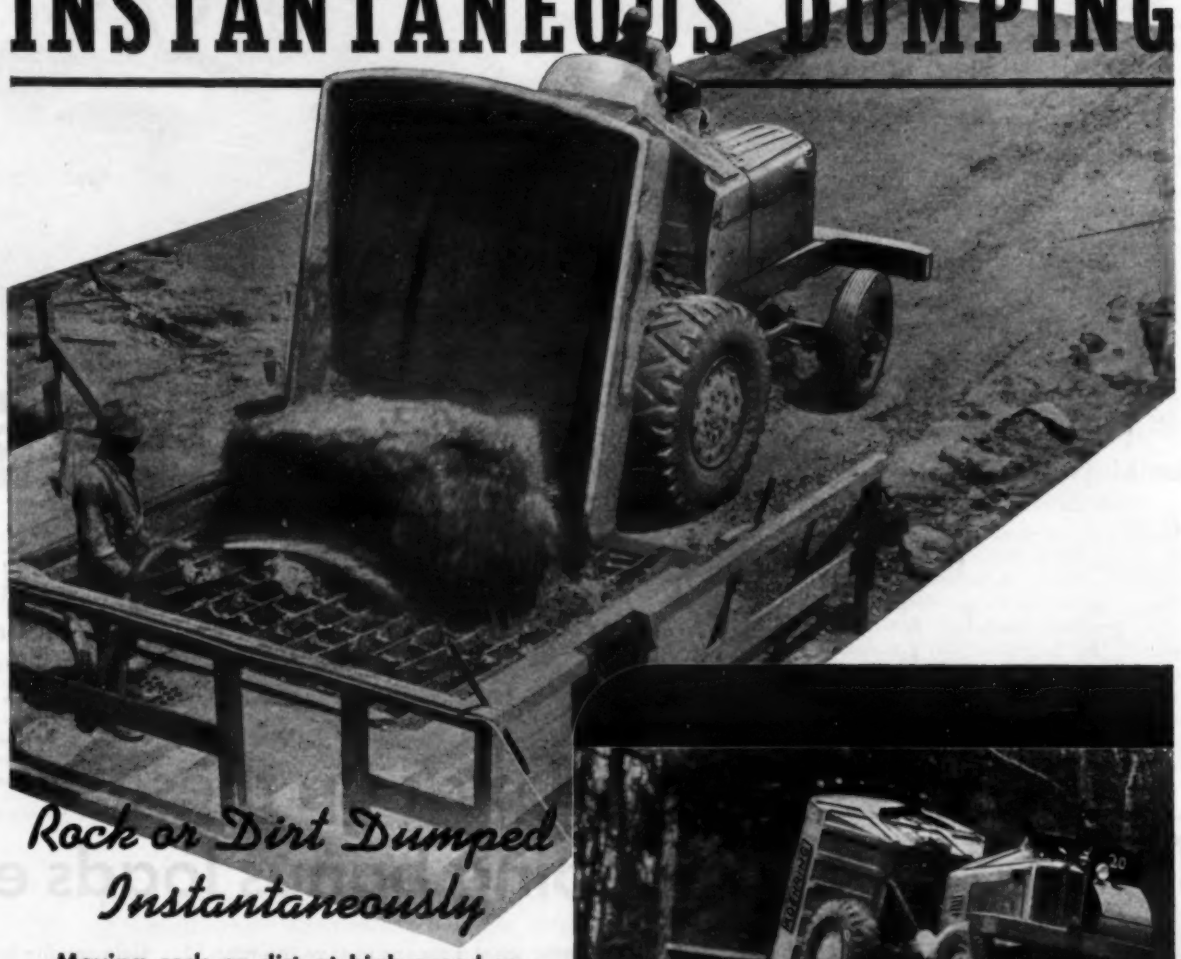

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KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

Award Winners

(*Continued from page* 10)

Honorable Mentions

Two Honorable Mentions were also made by the judges. One, in the Southern Section, goes to Winston & Griffith of Dallas, Texas, winner of our 1939 National Roadside Development Award. This company was nominated by Torbert Slack, Landscape Architect, Louisiana Department of Highways, for excellence of work, unusual cooperation, and special equipment on a roadside-development contract at the intersection of State Routes 1 and 5, approximately 5 miles northeast of Alexandria, La.

This contract was the first in Louisiana in which mulch sodding was stipulated. From the start it was apparent that the contractor was anxious to accomplish the best possible results, and several sources of supply were inspected in order to secure a suitable sod. The contractor's sod-cutting and loading equipment, developed by J. C. Griffith and for which this firm received our National Award in 1939, contributed greatly to the efficiency and excellence of the work. It was also noted in the nomination that in two places, where extra dirt was needed to raise the ditches, the contractor agreed to spread this without extra remuneration.

The other Honorable Mention is for the work of E. Grant Perl, Superintendent for Carl H. Peterson Co., of Minneapolis, Minn., on a 1.742-mile roadside development contract northwest of Milan, Minn. In making this nomination, Harold E. Olson, Engineer of Roadside Development, Minnesota State Highway Department, stressed the care taken in all grading operations to blend the ends of all cuts into the adjacent topography with a gradual transition from roadside to countryside, which was accomplished by extra equipment hours furnished by the contractor's superintendent. Special care in the selection of topsoil, extra work and care in the preparation of shrub holes, the furnishing of 10 truck loads of manure for the shrubs, of the contractor's own volition, and the development by Mr. Perl of an excellent sod-cutting machine were other features of this job.

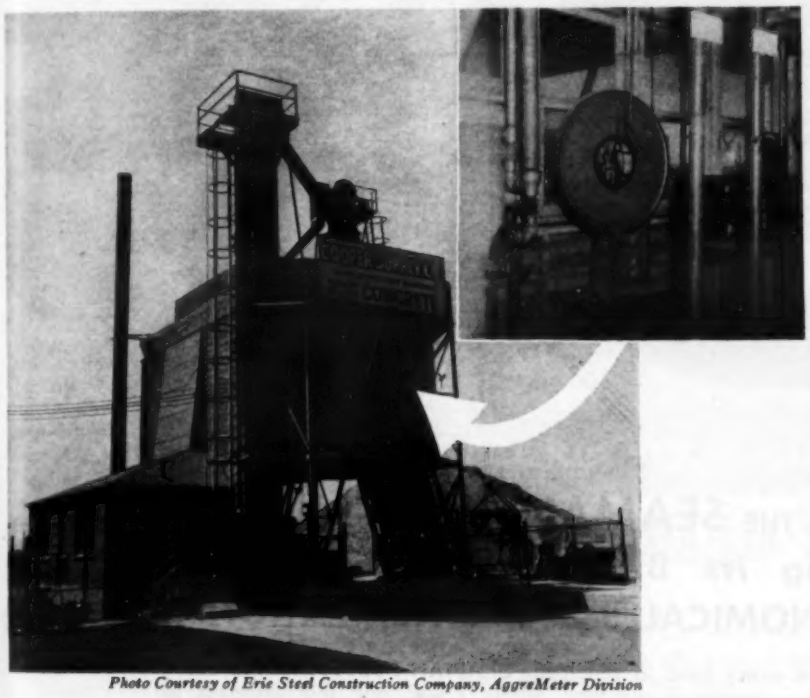
More Details to Come

Each of these contracts and the contributions made to roadside development by the Award winners will be described in more detail in subsequent articles, with illustrations, which we hope will further contribute to roadside development by passing on to others the excellent suggestions and developments for which these contractors have been honored by these Awards.

We regret that it is necessary to suspend these Awards for the duration, but we trust that they have served to stimulate greater interest in roadside development on the part of highway contractors and that many of our roadsides are more attractive to look at and more easily and economically maintained because of them.

New Calif. Haiss Dealer

The George Haiss Mfg. Co., New York City, has appointed Harron, Rickard & McCone Co., San Francisco, as its distributor in that territory, to handle the complete line of Haiss bucket and snow loaders, buckets and conveyors.



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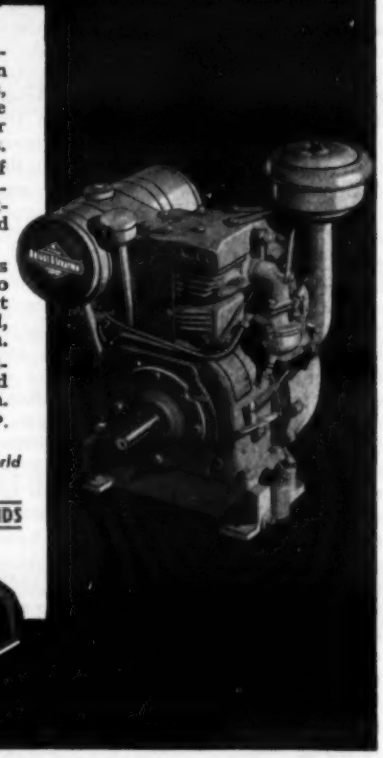
Tanks, trucks, jeeps, guns, planes, boats all get new "facials" often—protective colorings that blend with backgrounds, changing with the seasons or locale. Paint sprayers, powered by dependable Briggs & Stratton gasoline motors, do these jobs quickly.

Unusual tasks, like this one, form only a small part of our service to the armed forces — and are in addition to dozens of major uses—but all of them equally important.



The war effort now requires the entire production of Briggs & Stratton 4-cycle, air-cooled gasoline motors, so they are available only to those who are serving the war program, or for approved "essential" civilian uses.

We'll do our best to serve you, if your product fits these classifications, or if you are planning post-war production of gasoline-powered appliances and equipment.

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Slurry Pumping Used On Missouri's Roads

(*Continued from page 22*)

be from 1 to 1½ inches thick as a leveling and riding course which will reduce the impact on the old pavement. It will be necessary to pump slurry under the old section two or three times before this surfacing will be undertaken, as the pavement is so shattered by the failure of the base that the entire subgrade must be rebuilt by this slurry pumping, or complete reconstruction would be necessary.

The repeated slurry pumping of a pavement to secure the complete value of the Mud-Jacking is necessary because the roadway is being used constantly by traffic during the work and every time a heavy truck goes over a section that has just been underlaid with the mud slurry by the Mud-Jack, there is a slight depression of the pavement and when it springs up the mud slurry does not flow back under the entire section so that a slight void is left. The second and third pumping with the mud slurry usually fills these slight voids between the pavement and previous slurry pumpings.

Work in Division 5

The area on which work is to be done is surveyed by a crew of experts who mark on the pavement every spot where a hole is to be drilled for the Mud-Jack to operate. These spots are selected beyond each crack in the direction of traffic and the holes drilled from 10 to 12 inches from the center line of the pavement and the same distance from the crack. The spots are indicated on the pavement by yellow traffic paint and then the one-man drilling outfit goes ahead of the Mud-Jack crew and prepares the holes. He has a light Federal truck towing a 110-foot Sullivan 2-wheel air compressor and a Gardner-Denver jackhammer. The drilling of a single hole takes from 30 to 40 seconds and there invariably occurs a spalling of the under surface of the pavement for a diameter of 8 to 12 inches and up to 1 inch deep. This is caused by the drilling of the slab which is unsupported beneath. The drill used is a 1½-inch bit which gives a proper size of hole for the cone nozzle of the Mud-Jack hose.

The slurry-pumping outfit consists of two 1½-ton trucks with the sides boarded up to give exactly 2 cubic yards to the load. There is one driver for the two trucks who, with a helper, loads one truck while the other is being unloaded into the Mud-Jack hopper. The helper strips the area from which the top soil is being taken, carefully removing all roots and other material that might stick in the nozzle of the machine. A third man always does the feeding of the sandy loam with the cement to the hopper of the Mud-Jack. The soil is prepared by dumping the contents of eight sacks of cement over the top of the load of soil and as it is loaded into the hopper the man shovels the material carefully so as to mix the cement uniformly with the soil.

One man tends the Mud-Jack at all times so that it may be shut off instantly in case of a block in the line. The Mud-Jack used has an 8-inch cylinder for pumping. One man operates the cone nozzle of the machine at the end of 50 feet of 2-inch rubber hose wound with wire to prolong its life and give some added strength against bursting in case it clogs at the nozzle and the pressure builds up. As a further protection to the hose it is carried on a series of seven dollies, each with four caster wheels. There is a plug valve at the machine and a quick operating shut-off valve at the nozzle to prevent the spilling of the slurry on the pavement when moving and also to check waste of the mixture. The nozzle is tapered from 2 inches at the hose connection to 1¼ inches where it discharges, with the inside diameter about 1 inch. A splash sheet is built over the nozzle to prevent the operator being plastered with the slurry in

(*Concluded on next page*)

Tanks produce results only in actual combat on the firing line.

To conserve their fighting capacity they ride to battle on Rogers Trailers, or if damaged are transported to the rear for repairs on a retriever type of trailer especially equipped to load disabled tanks.

Meanwhile, thousands of standard Rogers Trailers are serving efficiently on our factory fronts or in transporting defense equipment to various fortifications.

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Frankly, we don't know every land in which the SEAMAN PULVI-MIXER is doing its job . . . but we are certain of one fact: where speed and thoroughness in stabilization or in-place mixing are essential, you'll generally find a SEAMAN! The rotary principle in pulverizing and mixing materials as pioneered by SEAMAN is the keynote to the success of the PULVI-MIXER. Revolving tines operating at high speed mix the materials with remarkable uniformity to the full depth of treatment. Speed and economy go hand-in-hand with thoroughness. In square yards of finished stabilization per hour of work . . . in low investment and operating cost, the SEAMAN PULVI-MIXER puts many dollars of *extra* profit into the contractor's pocket. . . . For any stabilization process — investigate the SEAMAN.

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C. & E. M. Photo
Drilling Mud-Jack holes with a Gardner-Denver jackhammer.

Repairing Pavements Damaged by Traffic

(*Continued from preceding page*)

case the pressure builds up too much in the hole and blows back.

Water for the operation is provided by a 2-ton FWD truck carrying a 500-gallon tank and a small Jaeger Sure-Prime pump used to pick up the water from creeks along the right-of-way. The water truck tows the Mud-Jack along the road during operations. The water content of the thin slurry used for this type of work, which is much thinner than the mud used for regular Mud-Jacking operations, is from 50 to 55 per cent of the mixture. The pumping is continued until the slurry has spread in all directions but the biggest void seems to be down the center of the pavement where there is invariably a longitudinal plane of weakness built into the pavement by the specified method of construction and where the pavement is always thinnest, in accordance with the sacred findings of the Bates Road Tests. In work in the Kirkwood area, Division 6, the pumping showed about ⅛ inch of the slurry required at the outside of the pavement and 3 inches along the center line of the pavement in one test section which was observed.

The pumping of the slurry is stopped the moment there is any sign of a lifting of the pavement as it is not the aim of this work to move the pavement in any way. The object is to fill the voids beneath the pavement to prevent further pumping by traffic and the consequent loss of subgrade material and in this way to put an end to the progressive transverse cracking of the pavement in the direction of traffic movement. When pumping is being done at one hole, the next hole, where there is likely to be an out-pouring of the slurry, is watched carefully and the moment there is evidence of the slurry rising in the hole it is plugged with a tapered wood plug made especially for this purpose. Similarly when a hole has taken all the slurry that seems possible in the one pumping without lifting the pavement, the hole is plugged instantly when the nozzle is withdrawn so that a minimum of the slurry will be lost due to the back pressure within the hole. These plugs are 18 inches long, made of 3 x 3-inch oak sign posts turned down on a lathe, and taper from 2 to 1¼ inches in 12 inches. One man works with the crew, cleans the pavement, and removes the plugs that have been left in the holes. As the slurry sets up very quickly and stops running, the plugs may be removed almost immediately after pumping ceases at the next hole.

On the first pumping of a hole, a vent is opened at the shoulder by driving a crow bar against the pavement in line with the pumping operation. This permits any accumulation of water beneath the pavement to escape as the slurry is pumped in and it also shows the outrun of the slurry when it has reached the edge of the pavement. About half the vent holes made do not show any run of the slurry without raising the pavement. Usually the center line of the pavement is raised or "sprung" just enough to be noticed and then the next place where the raising action is usually noticed is at the edge. When work is completed in an area, the holes are filled with a mixture of the soil and a veneer of cement and pressed down with the heel.

Using the sandy loam found along the right-of-way, the cost of the operation is about $7.13 per cubic yard pumped, each hole drilled in the limestone-aggregate concrete pavement costing 7½ cents. In a 9-hour pumping day from 12 to 16 cubic yards of the slurry will be pumped. It takes about one hour to clean the Mud-Jack thoroughly to remove any cement that might cause sticking of the parts when operation is resumed the following day.

Future Work

Illinois has used a mixture of SC oil with the soil and reports reasonable success with the method. The experiments with this in Missouri, using an MC cut-back asphalt in about the same proportion, have not been carried far enough to report on the results. It has been found that the pounding or pumping action of traffic tends to make the asphalt bleed from under the pavement as it is squeezed out of the mixture by the repeated impacts.

Missouri plans to try plaster of Paris in the mix to get a quicker set and thus make it unnecessary to pump a second and third time. Now the action of traffic produces voids beneath the pavement that has only one or even two pumpings with the slurry. It is planned to substitute two sacks of the plaster of Paris for two of the eight bags of cement in a 2-yard load of the silty loam.

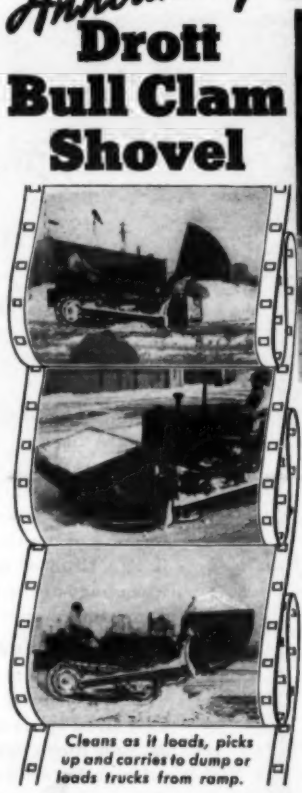
Personnel

The work of slurry pumping as a preventive and corrective measure is under the direction of Rex Whitton, Maintenance Engineer. Operations in Division 5 are in charge of V. B. Saville, Division Engineer, and George E. Wolf, Division Maintenance Engineer, with J. E. Chadwick, Assistant Division Maintenance Engineer, in direct charge of the field work.

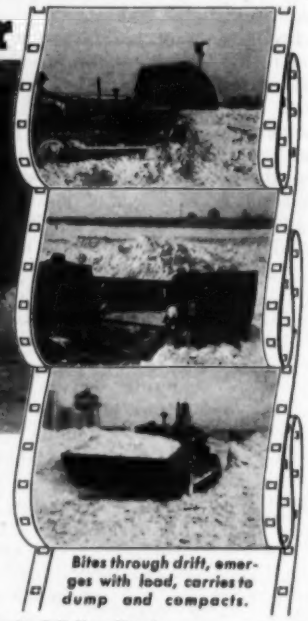
Homestead Valve Award

The United States Maritime Commission has awarded the men and women of Homestead Valve Mfg. Co., Inc., Coraopolis, Pa., the coveted "M" Pennant, Victory Fleet Flag, and Award of Merit Badges. This award came as a result of the fulfilling of the requirements of the Maritime Commission for manifold valves during which a production figure 800 per cent over 1940 was achieved.

Announcing **a SNOW BUCKET for Drott Bull Clam Shovel**



Cleans as it loads, picks up and carries to dump or loads trucks from ramp.



Bites through drift, emerges with load, carries to dump and compacts.

GETS RID OF SNOW — Quickly, economically, you can now pick up snow or ice... carry it or load into trucks from around close places like airport hangars, garages, buildings, machinery, driveways... from airport runways, streets! Ideal for countless auxiliary highway uses in connection with snow plows. Compresses loose snow to ¼ measure as it "boils" into bucket. Loads "on the go" on a straightaway... bites easily through banks or drifts. Removes ice as well! Works at high or low speeds. Wire, write or call for full information.

- Attachable to any regular Bull Clam Shovel.
- Hydraulically controlled from driver's seat.
- Up to 3' lift above ground — clears snow or ice to ground level.
- Can build own snow ramp for loading trucks... special wooden ramp also available.
- A right size for all makes of late model tractors — from 3 to 10 cu. yd. buckets. Compacts, picks up, transports 10 to 40 yds. of loose snow.

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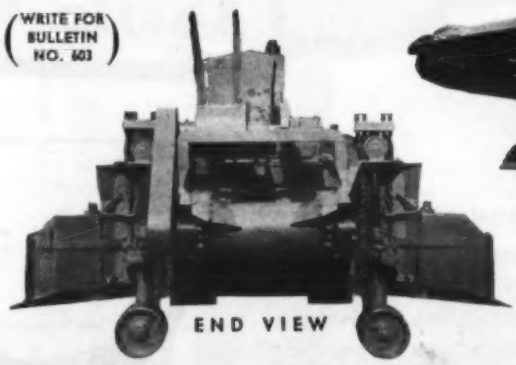
Make YOUR subgrading operations *pay a profit:*

A STANDARD Subgrader prepares subgrade at 50% to 90% saving!

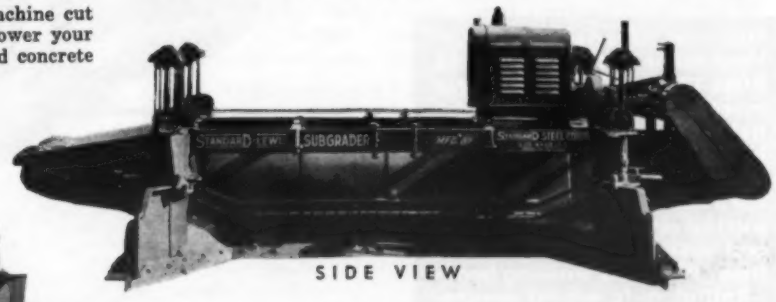
One operator and a helper can prepare subgrade with this machine at the lowest cost ever attained.

Not only does the efficiency of this machine cut down subgrading costs, but it will also lower your costs of rough grading, form setting, and concrete or asphalt placing.

(WRITE FOR BULLETIN NO. 603)



END VIEW



SIDE VIEW

And dollar losses due to voids and improper subgrade will be entirely eliminated.

This machine is building most of the airports in the West.

Detailed records to substantiate this claim are obtainable from contractors using these subgraders. *Write us for further information.*

STANDARD STEEL CORPORATION 5001 So. Boyle Los Angeles

Big Dirt-Moving Job For Eastern Airport

(*Continued from page 26*)

of alternate sections. The concrete was mixed in a paver run alongside the structure and either buggied or placed by bucket in the higher sections. A 1-yard crawler crane was used for the concrete bucket and a ½-yard crane to set the wood forms.

Dirt Moving to the Fills

The earth and shattered rock was placed in the fills in 8-inch loose layers, making 6-inch layers as compacted. A thickness of 12 inches was permitted by the specifications for earth fills containing hard rock. The rock fills used material up to 12 inches, but in spite of this allowance it was necessary to waste over 160,000 yards of oversize rock which it was not economical to mudcap.

Preparation of the layers as spread and rolled to prevent the possibility of settling was almost as careful as for an earth dam. Each layer was wet before the next layer was spread and the layer was wet again by a sprinkler truck before the rolling started. The sheepsfoot rollers used had feet at least 7 inches long from the cylinder and between 5 and 7 square inches in area. They were so spaced that there were three teeth for each 2 square feet of cylinder area. The specification further required that the total weight of the roller divided by the total area in inches of the maximum number of tamping feet in one row parallel to the axis of the roller must be not less than 500 pounds with the roller weighted nor more than 250 pounds with the roller empty. The layers of fill were rolled a minimum of six times by the sheepsfoot tamping rollers and as many more times as was necessary to permit the inspectors to "see daylight" beneath the cylinders of the rollers.

The excavation on this airport contract included clay, sandstone, shale and coal underlaid by indurated clay. In the finishing of the cuts special care was taken to construct drainage ditches at the tops of all banks for the removal of surface water to prevent erosion of the daylighted slopes.

The material-hauling equipment of the first of the associated contractors on this work included the following: six bottom-dump Euclids; seven Athey side-dump crawler wagons pulled by D8 tractors, with a pneumatic-tired bottom-dump Euclid hauling dirt while the Athey was hauling rock; six D8 tractors with LeTourneau bulldozers; six La-Plant-Choate 32-yard scrapers pulled by D8 tractors; three 12-yard LeTourneau Carryall scrapers pulled by D8 tractors; two LaPlant-Choate sheepsfoot tamping rollers with D8 tractors; and three 12-ton Buffalo-Springfield steel-wheel rollers. Additional miscellaneous equipment used by this contractor included two D8 pusher tractors equipped with special 3½-foot square pusher plates welded with a rim to prevent the plate slipping from the rear buffer on the scraper and the plates equipped with four heavy springs to take up the shock of the tractor hitting the scraper. There were also a fuel truck, a water truck, an Adams patrol grader on the fills, a Caterpillar power grader on the fills, and six grease trucks of which two were special Lincoln fleet greasing jobs.

U. S. E. D. Photo

Excavation in shale on the NE-SW runway with a B-E shovel loading a Euclid.

The second member of the contracting group used: seven bottom-dump and three end-dump Euclids; five end-dump Sterling trucks; three side-dump Athey crawler wagons pulled by D8 tractors for rock; one LeTourneau bulldozer on a D8 tractor; five LeTourneau Angledozers on D8 tractors; two D8 pusher tractors; one D8 tractor pulling six LaPlant-Choate tamping roller drums; one Buffalo-Springfield steel-wheel roller; three Caterpillar motor graders; one LaPlant-Choate scraper with D8 tractor; four 30-yard LeTourneau Carryalls with D8 tractors; five 12-yard LeTourneau Carryalls with D8's; seven 16-yard Tournapulls; two water trucks; one diesel fuel truck and one gas truck;

(*Continued on next page*)

ROLL-TAMP

This most talked about rubber-tired roller on the market. The ROLL-TAMP offers the buyer more real value. It excels the field through its uniform rolling pressure—Fewer passes are required and gone are hard and soft spots in the compacted area—More effective and less costly because it saves time—Patented walking beam—Radial axle wheel mountings, adjustable height drawbar and dual supporting stanchions make this Roll Tamp a most desirable piece of equipment.

Please write for descriptive bulletin MP-112B.

MADSEN
IRON WORKS
HUNTINGTON PARK, CALIFORNIA

Keeping a Time Honored Tradition Alive

and Making the New Year a Living Issue

Again, the time is at hand, **when that wholesome American custom, of extending Greetings and New Year's Wishes, is observed by men of all stations and walks of life. It is a time of goodwill that springs from a spirit, grateful for the things we have and enjoy as a liberty loving people. And, it is a time of inventory and resolve—when the worn page of the past year is reviewed, turned and a new one greets us as we make a fresh start.**

While endeavoring to look ahead, **the year 1943 takes on a new significance. Heartened by what our armed forces are doing, we as a Nation have been spurred to greater action. And many of us, now more than ever, are striving to match the valor and sacrifice of our boys, so that throughout the coming year we can be happy in the thought of jobs well done—jobs that will hasten early victory and preserve that which we cherish and hold dear.**

It is in this spirit, **coupled with a desire to be of the greatest possible service, that we and all Austin-Western Distributors extend to you and yours our wishes for health and success, here at home as well as abroad.**

THE AUSTIN-WESTERN ROAD MACHINERY CO.
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WITH SERVICE DOUBLY IMPORTANT
during the duration you will find your Austin-Western Distributor and its staff ready and willing to give you all possible help and cooperation.

Dairy Farm Converted Into Airport for Army

(*Continued from preceding page*)

one 6-ton Killefer rooter and D8 tractor; two smaller Killefer rooters; and two greasing trucks.

Removing Rock and Coal

Two deposits of coal were encountered in the excavation, the larger deposit being reserved by the county as a part of the right-of-way negotiations. The smaller deposit, amounting to about 15,000 tons, was included as regular excavation and was disposed of by the contractors. The larger of the two deposits was estimated to contain 300,000 tons of usable coal; however, actual operations produced not over 100,000 tons because of the large amount of roof coal or "coal bloom" encountered. The coal in the larger deposit was stockpiled and will be removed or disposed of by the county.

The rock-loading equipment of the two contractors included: one Bucyrus-Erie 54-B shovel; two Northwest 80-D shovels; one Northwest 25 shovel; one Bucyrus-Erie 48-B; one Bucyrus-Erie 43-B and one Bucyrus-Erie 37-B shovel. All were equipped with Amsco manganese-steel buckets for rock work.

The rock drilling was done entirely by Cleveland and Ingersoll-Rand wagon drills with Timken detachable bits, running 12-foot holes. In the tough sandstone the bits wore rapidly on the shoulders, giving about 4 feet of hole per bit. The footage was much greater in the softer shales. Air for the wagon drills was furnished by two 300-cubic foot I-R compressors mounted on D8 tractors; two 300-cubic foot compressor units mounted on trucks and two 520-cubic foot I-R compressors mounted as trailer units on steel wheels. Eight wagon drills were used, one drill with each of the 300-cubic foot compressors and two drills with each of the larger compressors.

The holes were loaded with Austin, du Pont or Atlas 40 per cent gelatin dynamite and fired from the lighting plants. For small isolated shots, mud-capping and stump blasting, hand-operated blasting machines were used.

Much of the rock was taken out by the scrapers after it had been loosened by the big 6-ton rooter, the scrapers being aided by the pushers. The punishment that the scrapers received seemed well beyond the limits of man-engineered construction. Frequently the rear wheels of the scrapers would be entirely off the ground by several feet, due to the inequalities of the rocky ground or to the peculiar stratification of the rock, and then the tires would be crashed down onto the rock, making the entire machine shudder as it took the shock and asked for more. The biggest fill was over the 12 x 12-foot culvert where it spread out over several acres, looking much like the construction of a large earth dam.

U. S. E. D. Photo

Excavating on the E-W runway with 32-yard LaPlant-Choate scrapers, using pusher tractors for loading.

Great care was necessary to plan the hauling operations with acuteness, as the large area of the operation, the depths of the cuts and the sizes of the fills might easily have led to much cross-hauling of material and waste of time and equipment. As it was, there was a well-regulated routing of the hauling equipment so that the Superintendent knew where each piece of equipment was operating at the moment. If it was not in sight, it showed up in a few minutes as the hauls were made at the maximum speeds of the tractors or other hauling units.

Floodlighting and Lubrication

A job that is moving 35,000 cubic yards of material a day does not shut down at night, so these contractors had extended themselves to provide adequate lighting equipment for night work. It had to be portable and it had to be able to move quickly. The ultimate in mobility for floodlighting was provided by a panel-body truck with three floodlights mounted along each side of the top of the body and a Caterpillar 20-kw lighting plant protected from dust and dirt inside the body. There were also several 3,000 and 5,000-watt Kohler lighting

(*Concluded on page 58*)

"Keep 'em Pumping" for HEMISPHERE DEFENSE

In the defense of the Western Hemisphere, Davey compressors are doing a man-sized job.

In addition to their important contribution in the building of airports and strategic highways, Davey compressors are today furnishing compressed air for an ever growing variety of operations ranging from vessel salvage to the many applications of industrial plants.

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YOU NEED CARVER Certified PUMPS

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Mud, sand and grit hold no terrors for a Carver pump because:

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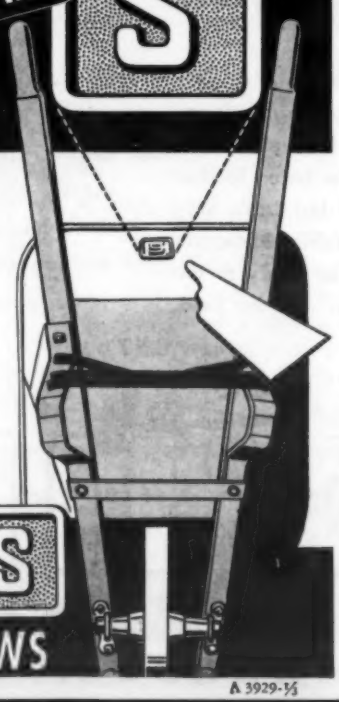

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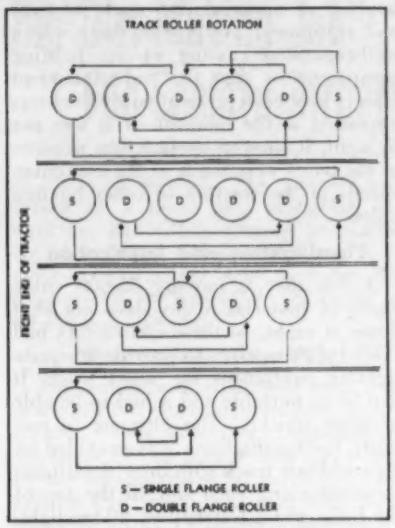


Caterpillar's suggestions for the rotation of track rollers on various-sized tractors.

Methods of Repairing Rollers and Grousers

(*Continued from page 20*)

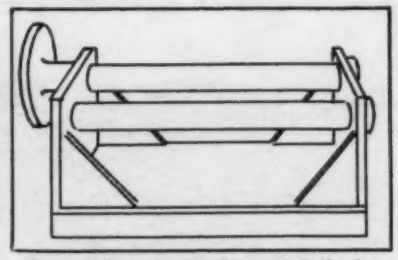
slide rather than roll in the sprocket teeth, it is then time to check and rebuild the teeth. Checking with a template such as shown on page 20 is a great aid. After removing the sprocket, run a shaft through the hub and place the ends on saw horses so that the wheel may be turned and permit the placing of the metal always at a downward 45-degree angle. Fill in the low spots with a 3/16-inch diameter high-carbon rod, adjusting the machine for 150 amps and using reverse polarity. The finish layer should be a single layer of the same size of self-hardening rod, using the reverse polarity and about 175 amps. The beads should be applied transversely and the deposit of each rod peened while it is still red hot. The amount of high-carbon rod required depends on the extent of wear, but from 7 to 10 pounds of the coated self-hardening rod is needed to resurface the sprocket from an RD8 Caterpillar tractor. The welding time is from 2½ to 5 hours.

The procedure for idler wheels is about the same, requiring usually not more than 15 pounds of self-hardening rod for the idler wheel from a large tractor. The welding time varies from 3 to 6 hours.

Track Rollers

Track rollers which guide the track and distribute the weight of the tractor over a large ground area carry very heavy loads and, as they are located close to the ground, are subjected to severe wear from mud and other abrasive agents. Under these conditions lubrication every few hours is advisable. Front-end equipment, such as bulldozers, angledozers and snow plows, add to the heavy loads on the front track rollers so that it is well to change the position of the rollers to distribute wear and postpone necessary, but eventual, rebuilding. This should be done at the half-way mark in the normal life of the rollers. The accompanying illustration from Caterpillar Tractor Co. shows how it should be done. The arrows show the suggested rearrangement of the rollers. The top diagram shows the original positions on large tractors where the double-flange roller is used at the front. The other diagrams show the roller arrangement on the other sizes of tractors.

When it comes time to rebuild steel rollers, it is well to have some convenient jig on which the rollers can be easily positioned by hand during the welding operation. First, clean the area to be built up by wire brushing, buffing or blasting. Then, if the roller is of the single-flange type, set the machine at 125 amps, and apply a guide bead around the outer edge with 3/16-inch coated self-hardening rod. This bead should be as thick as the proposed build-up. Thus, if the roller is worn ½ inch on diameter, the guide bead should be ¼ inch high. The second step is to set the machine at 150 amps and apply the first layer of self-hardening rod between the guide bead and the flange. This should be a straight pass, each bead being parallel to the preceding bead. For the second and final pass the machine should be set at 160 amps, high voltage. The additional heat provides for a smooth, dense application and has a tendency to wash down any high spots. The third step is to apply a weaving bead to the flange, adjusting the machine to approximately 150 amps. Peening improves the impact resistance of self-hardening beads so that it is advisable to peen the deposit of each rod as it is applied. This is especially important where the tractor is working in rock or is being used for long hauls.



An easy-to-make hand-operated jig for rebuilding tractor track rollers.

The same procedure applies to double-flange rollers except that the guide bead is omitted. Where wear is extreme it is sometimes advisable to apply a pass of high-carbon rod before applying the self-hardening. Welders who have had a little practice can rebuild a worn roller so accurately that no grinding is necessary. The cost of rebuilding a set of rollers, including time, material and overhead, is usually less than one-third the cost of a new set of rollers.

Tractor Grousers

Tractor grousers can be protected with a self-hardening alloy before they are put into service and their lives materially extended. Then after the normal wear has taken place a bar may be welded to the grouser and covered with a self-hardening alloy. For protection before the grouser is placed in service it is necessary to apply only a single layer of ¼-inch coated self-hardening rod with 1½-inch spaces at intervals to

(*Continued on next page*)

NEED A BIG Trailer?
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AIR CONTROLLED
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These track grouser cleats have been surfaced with a self-hardening electrode before excessive wear took place, thus avoiding the necessity of completely rebuilding.

Hard-Facing Tractor Parts Increases Life

(*Continued from preceding page*)

eliminate the danger of cracking of the deposit. These deposits are peened while still red hot and only ¼ to ½ pound of the alloy is required for each grouser.

To rebuild a worn grouser, a bar of reinforcing steel of the proper diameter is welded to the old cleat with 3/16-inch high-carbon rod and then covered with the single layer of ¼-inch self-hardening alloy. The cost of the reclaiming operation, including time, material and power, is about $1.75 per grouser. One self-hardening application adds from 50 to 100 per cent to the life of the grouser and can be repeated as often as necessary.

Tractor Tracks

Track life is not measured in hours alone as the character of the soil, or rock, over which it operates, the speed and distance traveled, all influence the time before reconditioning is required. To obtain the maximum life from the tracks before the reconditioning operation, they should be kept adjusted correctly. If they are too tight, the added load will be placed not only between the pins and bushings, but also on the sprockets and front idlers. On the other hand, if they are allowed to run too loosely, additional movement between the surfaces of the pins and bushings is caused when the tracks sag between the points of support. The front idlers should be kept in alignment to prevent the tracks from rubbing abnormally against the flanges of the track rollers.

Track reconditioning at the proper time is most important. As wear takes place between the track pins and bushings, the track becomes longer. This can be compensated for by adjusting the tracks as described in the manufacturer's operators' instruction books. Tracks should be reconditioned when the limit of this adjustment is reached. Such reconditioning should not be delayed, however, until the bushings have become so worn by contact with the sprocket teeth that the walls are extremely thin or broken.

When a tractor is torn down so that the rollers can be hard-faced, it is a good idea to hard-face the tracks at the same time. The hard-facing of the tracks, however, is limited to those that can be rebuilt to size with one layer of metal. Common procedure is to lay the tracks out on the floor, or across a set of saw horses, then apply a guide bead of high-carbon rod to one side of approximately twelve rails. Then return and apply another bead to the opposite side of the rails. A weaving pass of self-hardening rod between the two high-carbon guide beads completes the job. The success of the entire operation depends largely upon peening the deposit of each rod while it is still red hot. Peening serves to perfect the impact resistance of the self-hardening rod deposited and also relieves stress and prevents the deposit from chipping off. When the job is completed, be sure to check the rail ends to see that they have the proper clearance as any excess metal must be removed with a cutting torch.

A set of worn tracks hard-surfaced with coated self-hardening rod usually lasts 25 to 50 per cent longer than a new set of rails. The cost of the entire rebuilding operation is about one-quarter the cost of a new set of rails. The welding time usually varies from 18 to 25 hours, depending upon the size of the track and the experience of the welder.

Metallizing

The process of metallizing is better adapted to the more permanent shop than to field repair shops. With this method of depositing metal on crankshafts and axles, as with the deposit of alloy rods by arc welding, the results usually far outlast the original metal because of the character of the alloy used. The costs are quite low when the work is done in reasonable amounts, and runs slightly below 30 cents per pound of metal actually applied by spraying onto the worn part. This assumes the purchase of the special metals in lots of 100 pounds at 11 cents a pound, labor at 85 cents an hour, oxygen at $1.00 and acetylene at $2.50 per 100 cubic feet, and air under 65-pound pressure at the rate of around 35-cfm at about 10 cents per 1,000 cubic feet. Overhead is not included in these estimates, according to the Metallizing Engineering Co., Long Island City, N. Y.

The equipment used for the spraying includes a 4¾-pound gun, the required regulators for the three gases and a lathe for the finishing of the parts of circular cross section after the metallizing deposit is completed.

This method is quite new in the field and has made rapid strides. The fact that the equipment, with the exception of

(*Concluded on page 51*)

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The BURCH TRUK-PATROL will clear the roads of slush and ice, and is the ideal machine for road and shoulder maintenance during the summer. Thus it is an all-year-round machine.

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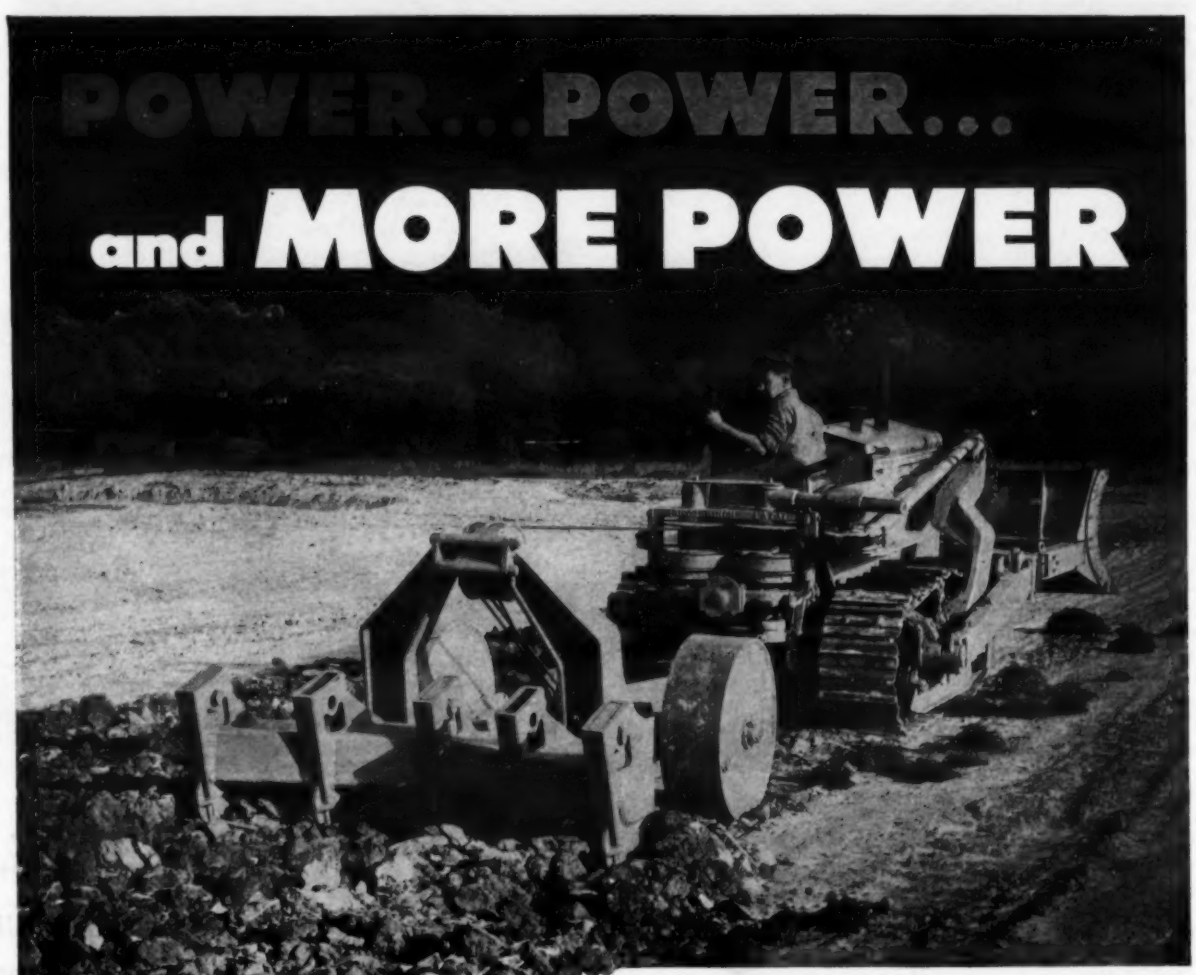

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Govt. Renegotiation On Equipment Sales

Revision of Government Contracts for Equipment Purchases, Under Existing Set-Up, Penalizes Manufacturer with Possible Loss to Equipment Distributor

✦ MANY manufacturers of construction equipment are still making and selling to government agencies many of the machines that they produced for private industry prior to the war. These manufacturers are subject to the effects of renegotiation of their sales prices to the Government just as much as are those manufacturers who are producing ordnance and other products under contract. The result of renegotiation in many cases has been a revision of the cost downward as far as the price paid by the Government is concerned and sales costs have been disallowed on the theory that practically no sales cost is involved in sales to the Government.

Most manufacturers of construction equipment sell their products through distributors, and the distributor arrangement is set forth in written contracts which cover the territory, the rates of commission to be paid, the terms of the agency, the financing, etc. These distributors of construction equipment function much like direct factory representatives in the assistance they render in the selection of the proper size and type of machine, the planning and location as well as the arrangement of the equipment on any given project. In this way, they contribute an invaluable service of an engineering consulting nature to their prospects and customers who in these days are primarily agencies of the Federal Government.

In the eyes of the manufacturer and the distributor, the rate of commission on a sale by a distributor to a government agency is no different from a sale to a private individual or company and involves just as much engineering talent and time in making the sale as would be required for the planning for a private installation. But the industry is now faced with the attitude of the Renegotiation Boards who are reported as not looking with favor on the awarding of standard commissions by a manufacturer to his distributor on a Government sale.

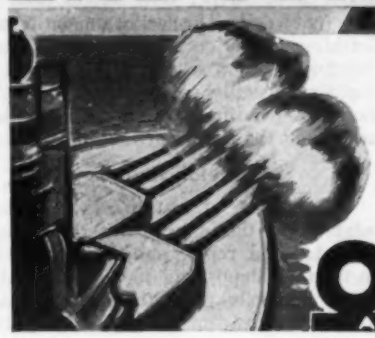
After having paid the regular commission to his distributor, a manufacturer may, after renegotiation, be required to reduce his price to the Government by a sum equal to the major portion of the commission he has paid to his distributor several months before, through the ruling of a Renegotiation Board that the rate of commission paid does not constitute an admissible part of the manufacturer's cost in arriving at the selling price to the Government. Under such a ruling, the manufacturer would have to pay out twice the standard commission, first to the distributor and then as a rebate to the Government, which would certainly be excessive.

As a result of this situation, manufacturers are left in a quandary. The manufacturer does not know what size commission on what volume of equipment sales to the Government will be allowed as a legitimate item of cost by the Renegotiation Board some months later. This aspect of the manufacturer-distributor-government business needs defining and clarification so that all parties involved will have a clear understanding of how much commission should be awarded to the distributor at the time the government sale is negotiated. If the distributor is going to suffer through the continued revision downward via the Renegotiation Boards, he cannot continue to take a part in government sales, while on the other hand the manufacturer cannot continue to be penalized through the dual payment of commissions, first to the distributor and then remit the same sum to the Government on its purchase. No manufacturer wants to see the distributor suffer through the loss of these commissions, as most of the sales possible today are to the government agencies.

This is a subject on which manufacturers and equipment distributors should unite to secure a ruling that is clear and understood by both selling parties and which will be an established policy for future Renegotiation Boards to follow. It is a difficult problem, because today the manufacturer may not have available a direct factory representative to send to every part of the country where a government agency wants to make a purchase of a piece of equipment, nor can the equipment distributor afford to provide the engineering talent and skill without the remuneration he should receive under his contract with the manufacturer.

ENDURANCE

ESSENTIAL TO PERFORMANCE



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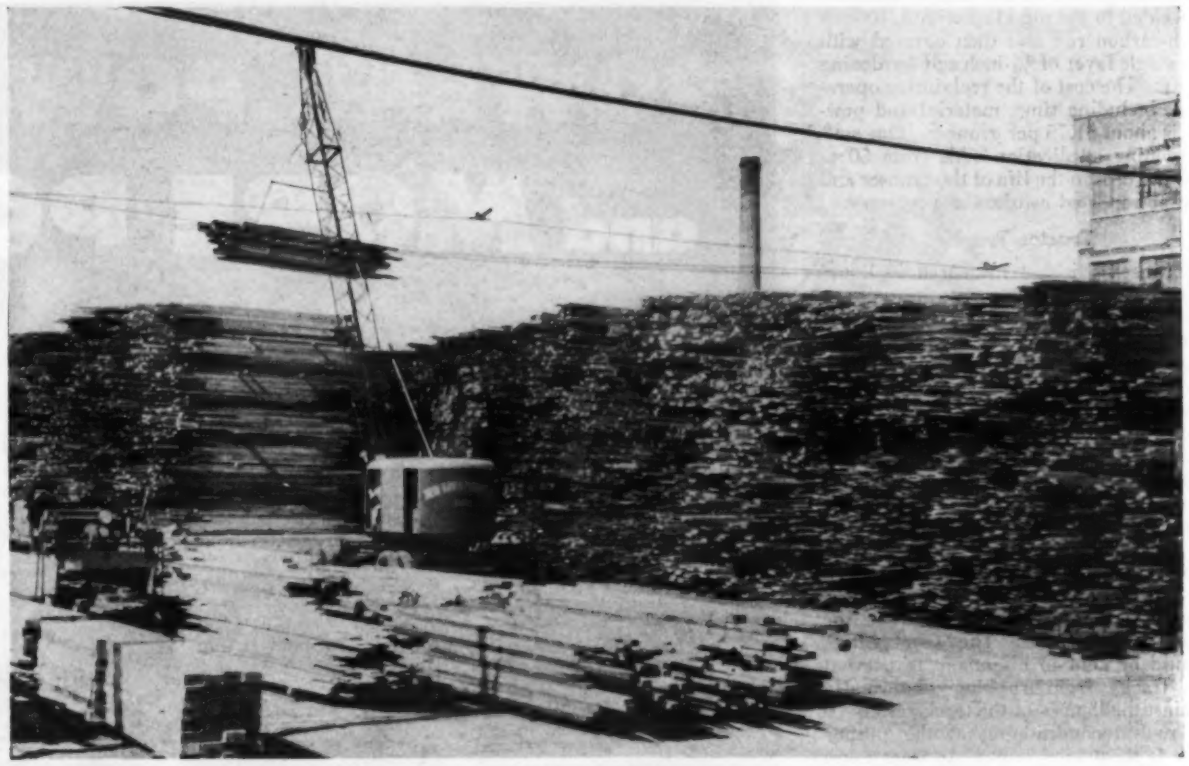
A MOUTHFUL AT EVERY BITE



GENERAL

recommends the continued purchase of War Bonds and Stamps—and the observance of preventative maintenance to keep your machinery running.

MOVE MORE, FASTER, FOR LESS

The GENERAL SUPERCRANE is a necessity on jobs that require more work per day, more speed on the job, and lower operating costs.

How can the GENERAL SUPERCRANE do all these things? It is self-propelled—mounted on Pneumatic tires—operated by one man, and powered by one engine.

The OSGOOD COMPANY
Sizes: 1½ to 2½ Cu. Yd.
Diesel - Oil - Gas - Electric
Associated with The GENERAL EXCAVATOR CO.

The HERCULES COMPANY
HERCULES "IRONEROLLERS"
6 to 12 Tons
Diesel or Gasoline
Associated with The GENERAL EXCAVATOR CO.

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Sizes: ⅜-½-⅝-¾ Cu. Yd.
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OSGOOD MARION OHIO U.S.A. GENERAL HERCULES

SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted

THE GENERAL EXCAVATOR COMPANY, Marion, Ohio

Extending the Life Of Crawler Tractors

(*Continued from page 49*)

the lathe for turning bearings to size after the deposition of the metal, can be made portable by a hand truck has greatly increased the flexibility of this method.

References Available

Among the literature available on the subject of maintaining, rebuilding or reconditioning tractor parts are the handbooks of Hobart Bros. and Lincoln Electric Co., the literature of The Stoody Co. including "Pointers on Rebuilding and Hard-Surfacing Construction Equipment" and special data sheets available free, and a recent booklet of the General Electric Co. containing an article by J. A. Cunningham, Welding Application Engineer, Arcway Equipment Co., Philadelphia, Pa., distributor of G-E arc welding equipment. Considerable information on the maintenance of tractor crankshafts and other construction equipment is available also in Metallizing Engineering Co.'s "Metco News".

To these should be added the Operators' Instruction Books of the various manufacturers of tractors and crawler-track units which describe the methods of maintaining the tractors and crawler equipment, and special booklets on their reconditioning. Included in these are special issues of *Cletrac Facts*, published by the Cleveland Tractor Co., Cleveland, Ohio, and "Keep 'em Working" of the Caterpillar Tractor Co., Peoria, Ill.

Acknowledgments

We wish to make special acknowledgment to the companies below for permission to use material from their specially prepared manuals, data sheets or other literature in the preparation of this maintenance article: The Stoody Co., Whittier, Calif., for the use of their special data sheets and illustrations credited to them; General Electric Co. for certain data on the rebuilding of sprockets and the illustrations credited to them: Caterpillar Tractor Co., for maintenance data: and Metallizing Engineering Co., Inc., Long Island City, N. Y., for data on the Metallizing Process.

New Edition on Steel And Timber Structures

The second edition of "Steel and Timber Structures," edited by George A. Hool and W. S. Kinne and revised by R. R. Zipprodt, Principal Civil Engineer, Office of the Quartermaster General, Washington, D. C., and D. M. Griffith, Professor and Chairman of the Department of Civil Engineering, Bucknell University, has recently been published.

Compiled by a staff of specialists and one of the six volumes in the Structural Engineers' Handbook Library, this new volume presents the latest authoritative data to aid engineers and construction men in the design and erection of steel and timber structures. It has been the objective in this new edition to introduce wherever necessary revised material which embodies the most recent design or construction procedure. For example, the plate-girder highway bridge in Section 3 has been completely redesigned to conform with the 1941 AASHO Standard Specifications for Highway Bridges.

In these days of steel shortages, of particular interest is the additional new material on the design of timber highway bridges and other structures.

Copies of "Steel and Timber Structures," which contains 724 pages, 433 illustrations and dozens of tables and charts, may be secured direct from the publisher, McGraw-Hill Book Co., 330 West 42nd St., New York City, or from CONTRACTORS AND ENGINEERS MONTHLY. Price: $6.00.

Buy War Bonds and Stamps regularly.

RUD-o-MATIC TAGLINE

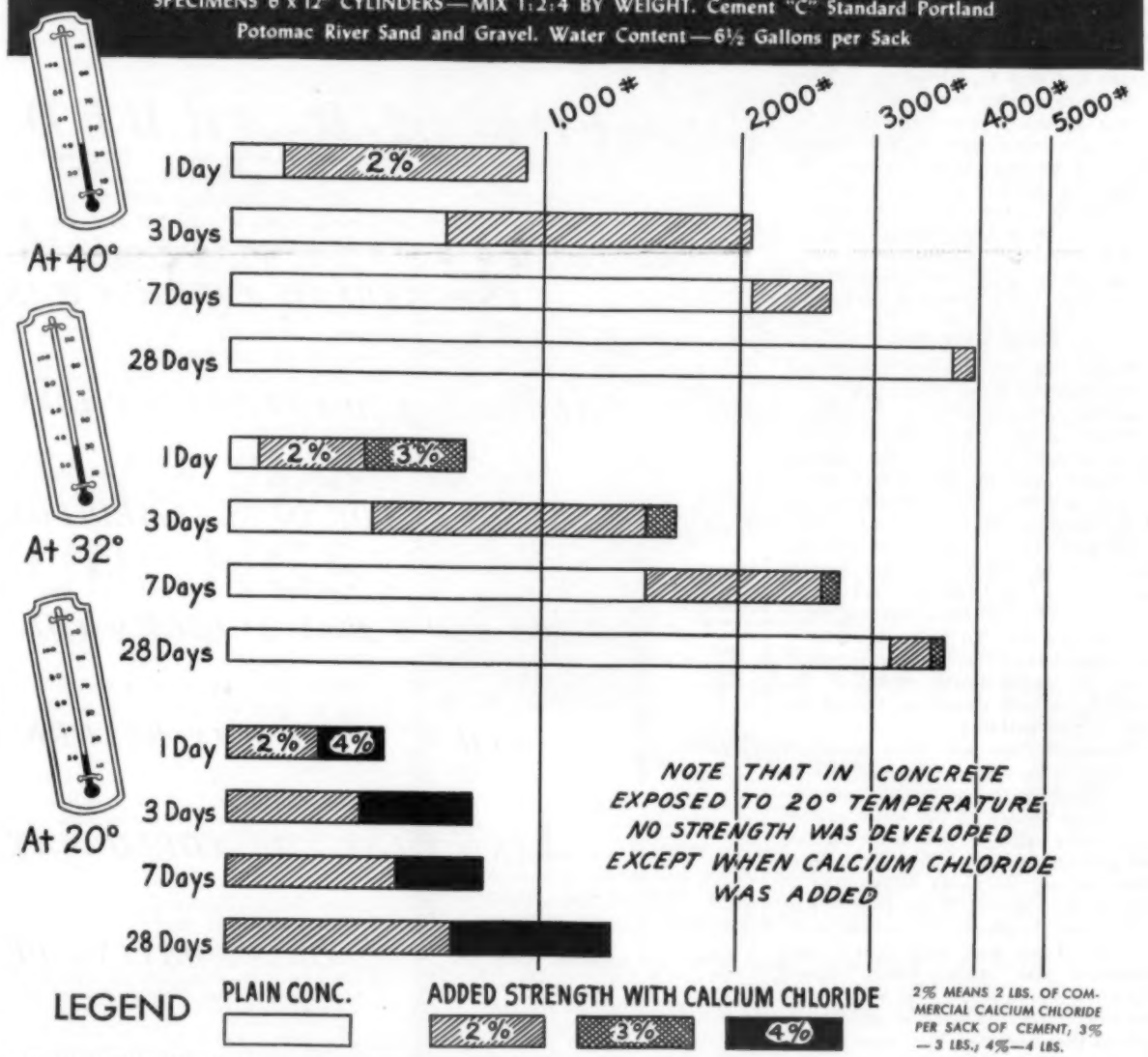
A FOOL-PROOF TAGLINE

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearing and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

Manufactured by
McCaffrey-Ruddock Tagline Corp.
2121 E. 25th St., Los Angeles

HOW CALCIUM CHLORIDE ADDS TO STRENGTH OF
CONCRETE EXPOSED TO LOW TEMPERATURES
DATA FROM TESTS AT NATIONAL BUREAU OF STANDARDS
(See Yates Report 1941 Proc. Highway Research Board)
SPECIMENS 6 x 12" CYLINDERS—MIX 1:2:4 BY WEIGHT. Cement "C" Standard Portland
Potomac River Sand and Gravel. Water Content—6½ Gallons per Sack



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SPEEDS YEAR-ROUND CONCRETE CONSTRUCTION

VULCAN TOOLS

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

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C. & E. M. Photo
The simple contraction joint used in the warehouse floors.

Paving the Floors For QM Warehouses

(*Continued from page* 25)

a Mixermobile, located about ¾ mile from the warehouses, where the batches were given a 1-minute mix before being delivered to the truck mixers to be hauled to the site of the pour. Inasmuch as the Mixermobile was being used to supply several operations, there was some delay at the start in getting the truck mixers, originally used on this job only as agitator trucks, away from the preliminary mixer at sufficient headway to prevent waits at the pouring operations. This was overcome by using the Mixermobile as a loading device only, supplemented by an additional hopper and skip to deliver the batches to the truck mixers and then doing the mixing in these units, a service for which they were designed. This change, suggested by the Area Engineer, increased the speed of production of concrete, the fly in the ointment being that there were nearly two dozen mixing units to check for control of the water instead of the single one when all the mixing was done by the Mixermobile.

Making the Pour

When pouring the four pairs of strips, starting from the outside, the truck mixers drove in at one end of the building on the lane adjacent to the one to be poured, delivered the concrete by chute over to the square being poured, and then drove out the far end of the building. This provided for more speed and cleared the trucks quickly. When pouring the final center lane, it was necessary to back the trucks in to the point of the pour and then run them forward and out. To make up partially for these delays, the contractor poured from the approximate center of the building in both directions toward the ends of the building.

The grade was wet down ahead of pouring to provide a sufficient amount of moisture in the soil to prevent robbing the concrete of the water needed for proper setting. One man handled the gate on the truck mixer, while three others swung the chute as required to deliver the concrete to the proper part of the slab. In pouring the middle strip, a crew of six men with shovels and equipped with rubber boots, cleaned the grade where it had been roughed by the trucks and then acted as puddlers to spread the concrete. Two men cleaned the adjacent slab during pouring so that no scattered concrete would adhere to the finished slabs.

Inasmuch as the warehouse was divided into separate sections by fire walls, the trucks had to be moved over the stubs of these when running through the warehouse. This was accomplished by setting up ramps of two thicknesses of 2 x 8's with 4 x 4 cleats at each end backed by a separate brace of five 2 x 8's at about the mid-point of the ramp.

The concrete was struck off by a heavy wood float with plow handles and two ropes for pulling it forward. This was operated by two laborers on the ropes and the first two finishers at the ends.

Finishing and Curing

The first of the finishing operations was the use of a second screed handled in much the same way as the first, but without the two men on the ropes. This was virtually a longitudinal float and left a very fair surface for the hand finishers. After using this float, the four hand finishers used long-handled steel floats, measuring 8 inches by 4 feet, to finish off any high or low points and edged both sides of the dummy joints after pulling the plate and also around all the expansion joint material.

C. & E. M. Photo
Hand and machine finishing at a QM Depot. A Whiteman float finished the floor surface while men edged the joints of the slabs.

The final finishing was done by a battery of four Whiteman gasoline-powered finishing trowels. These were usually put onto the slab about two hours after the pour had been completed, but the time depended somewhat on the character of the weather. If it was dull and humid, the time was extended considerably, but with hot, dry weather the 2-hour limit held. The four Whiteman finishers gave a final polish to about 4,000 square feet a day.

Following the completion of the finishing operation, the floors were sprayed with a light coat of MasterKure, which was quite red when applied, aiding in indicating the evenness of the coverage, and then gradually bleached almost colorless in the next few days.

Personnel

The construction of the warehouses and the paving of the floors was done by contract under the direction of the U. S. Engineer Department. In the interest of national security, the location of and mention of personnel connected with U. S. Army construction have been omitted.

C.H.&E.
MORTAR MIXER

Saw Rigs
Pumps
Hoists
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Bar Cutters
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INDUSTRIAL AMERICA HAS PLEDGED

ALL-OUT AND EVER-INCREASING PRODUCTION

FOR OUR ARMED FORCES

—THAT THEY MAY QUICKEN THE DAY OF VICTORY

—THAT THEY MAY RETURN IN SAFETY

—AND THAT THE WORLD MAY BE ASSURED

OF A LASTING PEACE

BETHLEHEM STEEL

Ceiling Service Rates Problem to Dealers

(*Continued from page 7*)

difficulty in keeping mechanics at the hourly rates which they are in a position to pay with the $2.00 ceiling. The reason for this is the rates which the Government itself has been paying for mechanics, with work seven days a week, time and a half for over 40 hours, and an hourly base pay of $1.65. In some government jobs a master mechanic is getting as much as $2.37½ so that such a man could not possibly be hired by a distributor with a $2.00 ceiling.

The majority of the men in a distributor's shop are factory trained and have had the benefit of schools which the manufacturers have created at their factories. In fact the mechanics have been very well satisfied with their employment in the distributors' service shops until the present rates went into effect. One distributor frankly states that he does not mind the labor rates provided the sales rates for service can be based proportionately. This, however, is impossible because so many of them charged a rate very close to $2.00 before the present increase in mechanics' rates went into effect.

Many distributors are in the position now of not being able to give their mechanics more money even if they want to and take a loss on the service side of their organization, which they might be willing to do just simply to hold the organization together, as there is very little other income to make up for this loss.

With the limit of $2.00 an hour for service charges, one distributor wants to know just how a service department can be carried on and be able to break even. This distributor has been charging $1.65 an hour for shop services. His mechanic gets over $1.00 an hour and then the distributor has to pay compensation insurance, old age benefits, for the use of land, building, light, heat and all the other overhead that must properly be assessed to a shop cost. Under present conditions it is just impossible to get along on the $1.65 rate for service which was charged in March, 1942.

Higher Rates Permitted

The OPA order MPR 136 permits rates higher than $2.00 where they were in effect as of March, 1942. Thus, several distributors who were charging $2.25 an hour for a considerable time filed this rate with OPA and were allowed to continue. One distributor pointed out that the spread between labor cost and the labor ceiling price should be 100 per cent so that if the mechanics are paid $1.00 an hour the distributor must collect $2.00 from his customer to take care of his overhead. It is almost impossible to hire mechanics today at $1.00 an hour, so that the $2.00 ceiling operates as a squeeze everywhere, and $2.25 is not too high a general ceiling to be permitted. One distributor who is charging $2.25 an hour for regular work has filed for time and a half for overtime and that has been allowed by OPA.

Rate Cut by OPA

A very careful study is being made under MPR 136 to be certain that the rates filed or applied for by those distributors who asked unusually high rates are not exorbitant. Distributors have been asked to file financial statements and profit and loss statements with data on the per cent of business under new machine sales, part sales, used machine sales, rentals, etc. With this information, OPA can determine whether a distributor can afford to operate at a loss in his service department, provided there is enough profit in the other branches of his business. Applications for rates as high as $2.70 an hour have been filed by distributors but were whittled down by OPA on the allegation that there had been a considerable change in the distributor's business, including increased volume of shop work, so that unit costs had decreased. One distributor who had a cost of $1.85, without any allowance for overhead, found that he just had to turn down service work. Because his rate had been $1.65 the necessary increase would, he felt, alienate customers of long standing.

Another distributor who applied for a $2.70 rate was told that the rate was altogether too high and that he would have a better chance for favorable action if the figure were reduced to $2.30. After considerable delay, it was found necessary to reduce this to $2.05 in order to secure favorable action.

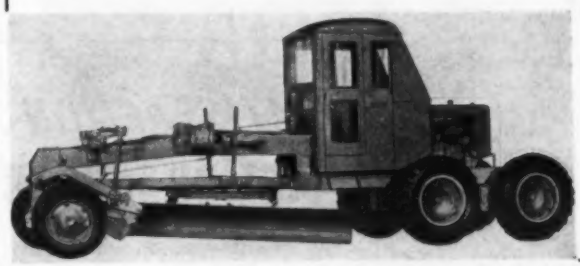
One distributor who has had occasion to go through the mill to secure an equitable rate states that he believes that OPA is willing to allow approximately 10 per cent net profit above all actual costs. He further states that he feels he was treated fairly and was mighty glad to get the rate settled even though it was somewhat lower than he felt was really justified.

He closes by saying, "My opinion is that many distributors are selling their services at a loss, that many of them are too lazy to present their case at Washington and go through with it. It isn't particularly difficult, and if they are willing to lay all the cards on the table I am convinced they will get relief, as my case is a positive proof of that."

WARCO W. A. RIDDELL CORPORATION BUCYRUS - - OHIO

YES! WARCO Motor Graders are also making their "All-Out" contribution to speed Victory—busily engaged in grading for air bases, flying fields; laying stabilized surfacing, and building strategic highways.

They are meeting with popular favor because they are able to "take it" in the present 'round-the-clock service, with a minimum of upkeep.

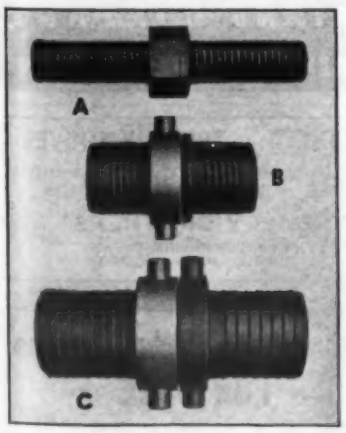


Your nearest WARCO Distributor will be glad to assist you in making your present grader last for the duration, by giving the proper service and repair attention.

"KING" *Malleable Iron* SHANK COUPLINGS

FOR SUCTION AND WATER HOSE

The couplings described below comprise a full range of styles and sizes for every service where shank couplings can be used to advantage. Formerly made in all brass or part brass, they are now made entirely of *malleable iron*, either black or synthetic enamel coated.



"KING" SHANK COUPLINGS give long, dependable service, with maximum convenience in connecting, disconnecting and resetting. Shanks have deep, clean corrugations. Sturdy pin-lug swivel nuts are sufficiently recessed to hold washer in place when hose is disconnected.

HEAVY PATTERN (C) has pin-lugs on both male and female sections. Shanks have ample length to accommodate two clamps. Sizes 3" to 8".

REGULAR PATTERN (B) is of adequate weight for smaller sizes of suction and water hose. Pin-lugs on female section only. Sizes 1½" to 3".

COMMON SHANK COUPLING (Not Illustrated) For water hose in smaller sizes. Has swivel nut on female section. Available in sizes up to 1½".

"KING" LONG SHANK COUPLING (A) A sturdy, durable coupling with shanks of ample length for two or more clamps. Female end has hex swivel nut; male end also has hex portion. Deep corrugations provide excellent gripping surface under clamp pressure. Sizes up to 2".

Sold by Manufacturers and Jobbers of Mechanical Rubber Goods

DIXON VALVE & COUPLING CO.

Main Office and Factory: PHILADELPHIA, PA.

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HERE'S THE PAY-OFF

It's the BUCKET that digs the dirt! And operators will tell you that A PAGE AUTOMATIC DRAGLINE BUCKET WILL OUTDIG ANY OTHER BUCKET OF EQUAL SIZE AND WEIGHT.

Why? Because the PAGE bucket is so shaped and designed that it AUTOMATICALLY lands in digging position every time. ALL its weight is ON THE TEETH causing it to DIG-RIGHT-IN AT ANY DEPTH!

Result: A PAGE AUTOMATIC DRAGLINE BUCKET eliminates waste motion . . . boosts production . . . saves man hours!

PAGE ENGINEERING COMPANY . Chicago, Illinois

PAGE Automatic DRAGLINE BUCKETS

BOOST PRODUCTION

KEEP AMERICA STRONG

An infra-red lamp to speed work in the drafting room.

An Infra-Red Lamp Speeds Ink Tracing

In these days when there is a shortage of manpower practically everywhere, including the drafting room, any device which will speed work and save time is worth consideration. The Lamp Division of Westinghouse Electric & Mfg. Co., is using a 250-watt R-40 bulb reflector drying lamp to speed the drying of ink and tracings. After tracing over a pencil drawing with ink, the draftsman turns the infra-red lamp on the drawing for about a minute. This takes all the moisture out of the ink and the paper so that after the pencil marks are erased, the ink lines remain sharp and black. Before using infra-red draftsmen had to go over the drawing a second time because the erasure produced gray lines, particularly in damp weather. By eliminating this second tracing, a draftsman can produce a finished drawing at least 10 per cent faster.

Complete information regarding this application may be secured direct from Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., by mentioning this item.

New Arc Welding Awards For Engineering Students

The James F. Lincoln Arc Welding Foundation of Cleveland, Ohio, sponsor of the 1940-42 nation-wide $200,000 arc welding award program, has announced its first program in the field of undergraduate engineering study.

This new project is a $6,750 Annual Engineering Undergraduate Award and Scholarship Program "to encourage engineering students to study arc welded construction so that their imagination, ability and vision may be given opportunity to extend knowledge of this method and thus aid the war effort and the economic reconstruction in the peace which is to follow."

The Program offers $5,000 in student awards and $1,750 in scholarships for the departments of the institutions in which the award-winning students are registered. There are seventy-seven student awards: a first of $1,000, second of $500, third of $250, four awards of $150, eight of $100, twelve of $50, and fifty of $25. There are seven scholarships of $250 each. The school of the first-award winner will receive four scholarships, totaling $1,000; the school of the second winner will receive two, totaling $500; and the school of the third winner, one scholarship of $250. The winning students will be given an additional honor as the scholarships in their schools will bear their names.

The awards will be made for papers describing the conversion from other methods to arc welded construction of parts of machines, complete machines, trusses, girders or structural parts. It is not necessary that the machine or structure be built; but the design or method of construction must be described on paper. If the paper covers a project, the project must have been completed between December 1, 1942, and April 1, 1943.

Any resident engineering undergraduate registered in any school, college or university in the United States giving a course in any branch of engineering or architecture, leading to a degree, or any cadet registered in the U. S. Military Academy, the U. S. Naval Academy or Coast Guard Academy is eligible to submit a paper in the award program.

Further details on this Undergraduate Award and Scholarship Program may be secured from the James F. Lincoln Arc Welding Foundation, P. O. Box 5728, Cleveland, Ohio.

Care of Steam Hose In Summer and Winter

Easy-to-read rules for the care and maintenance of steam hose, so vital now that rubber is so scarce, as well as detailed instructions on the proper ways to attach couplings, are contained in a revised catalog section issued by The B. F. Goodrich Co., Akron, Ohio. This section covers its lines of steam hose, which in winter are used for thawing out aggregate and are used summer and winter on steam cranes and shovels. Data on inside and outside diameters, weight and number of plies are listed.

Copies of this Catalog Section 4500 will be supplied by writing to Goodrich at Akron, and mentioning this item.

SATISFACTION . . .

MEMBRANE CURING COMPOUND

Provides better concrete curing—saves time and money.

Manufactured to meet any and all specifications.

Sold through Distributors throughout the country.

Wire, 'phone or write for name of distributor in your territory, or information.

Manufactured by

Waterproofing Division

BATTENFELD GREASE & OIL CORP.

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A few distributor territories still open

THE MOST IMPORTANT UNIT FOR AIRPORT RUNWAY CONSTRUCTION

Ariens Aggmixer

Wherever there is mixed-in-place construction such as soil-cement, bituminous, etc.

IT DOES THE JOB THOROUGHLY, RAPIDLY, AND ECONOMICALLY

The AGGMIXER operates with other general purpose road equipment—from power take-off shaft of any suitable tractor—easy and safe to operate. The swirling chopping action of the AGGMIXER tines does a thorough job of mixing—wet or dry. Illustrations above show use on airport runway construction. Send for job facts now.

ARIENS COMPANY, BRILLION, WISCONSIN

A NAME WORTH REMEMBERING

UNIVERSAL UNIT POWER SHOVEL CORPORATION — UNIT — MILWAUKEE WISCONSIN

A POWER SHOVEL WORTH WAITING FOR . . . . .

Today we are standing shoulder to shoulder with hard-hitting American industry in the gigantic task of producing essential war equipment to lick the Axis powers on all fronts. In this work we are making our engineering experience, heavy machinery production facilities and manufacturing skill *count.*

But when the dawn of the new day arrives, as it surely will, UNIT Power Shovels, Trenchoes, Clamshells, Cranes, Backfillers and Draglines will have a bigger job to perform than ever before. A shattered world will have to be rebuilt. And that will be a job for the most dependable, most flexible and speediest equipment.

Pending that "tomorrow" for which the world is waiting . . . "UNIT" is a good name to remember . . . and a Power Shovel worth waiting for!

UNIT 1020

¾ Yard Shovel

Other Sizes: ⅜ and ½ yard. Interchangeable to all attachments.

ARMY E NAVY

The first joint Navy and Army "E" Award for war production excellence in the Milwaukee industrial area was granted to this company, in August, 1942. This official recognition of manufacturing efficiency, under the stress of factory conversion and realignment conditions, reflects a basic capacity for doing things the right way.

UNIVERSAL UNIT POWER SHOVEL CORP.

MILWAUKEE, WIS., U. S. A.

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WANTED: TRACTOR SHOVEL

Used medium tractor shovel wanted

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Turbine Deep Well Pumps FOR SALE

8—25 hp, 500 to 1000 gpm, 220/440/60/3. Also 2 hp—5 hp—10 hp—20 hp—30 hp units, suitable for various depths and capacities.

Also Jet Pumps—Centrifugal and Plunger Pumps.

Send us inquiry on your requirements.

Refrigeration Equipment

1—50 hp Carbondale Compresser with Condenser and incidental equipment.

C. W. LAUMAN & CO., Inc.

50 Church Street — New York, N.Y.

Concrete Pipe Plant For Army Depot Job

(*Continued from page 2*)

through the 24-inch size, a single ring was welded to the cylinder at the top or spigot end, and a double reinforcing ring for 30-inch pipe and larger. The cylinders were then assembled on the cast iron base rings or palette, with the end wires of the cage run through holes in the base for pipe over 24 inches in diameter and bent over to hold the reinforcing steel in the lips of the pipe. For the smaller pipe, the ends were simply flared over the base ring.

The outside form for the pipe was in two parts which clamped around the cage and base ring and then, after lifting the assembly with a 2-wheeled buggy and putting it under a block and tackle, the core or inside form was inserted by the tackle. The core was held up from the base temporarily by a reinforcing bar through the core until the complete form was placed on the revolving table where the pipe was cast. As soon as it was set on the table, the bar was removed and the core rested on the table centered by the base ring.

Casting a Pipe

The sand and aggregate was measured by volume in wheelbarrows and dumped into a Besser 3-bag mixer with a spiral-blade mixing device. The maximum aggregate for 18-inch pipe and smaller was ¾-inch and for larger pipe it was 1¼-inch crushed stone with sand and pea gravel for the fine aggregate. The proportions were 5 cubic feet of the stone, 3 cubic feet of coarse sand, a pea gravel, and 4 cubic feet of fine sand. This was mixed with a minimum of water for 3 minutes in the blade mixer.

The dry mix was then dumped through a discharge door into the steel boot of a narrow scraper elevator for delivery to the top of the forms. The machine required 38 cubic feet of the aggregates, exclusive of water and cement, for one cubic yard of the mix. While the dry mix was being fed into the top of the form, the table was rotated rapidly so as to distribute the mix in the form and at the same time three automatic tampers packed the material into the forms. One operated between the cage and the core and the other two outside the cage next the outer form. This kept the cage centered, and the blows of the tampers, 600 per minute and 500 pounds per blow, compacted the mix so that although it looked and felt very dry before tamping, the water was readily visible on the pipe when the forms were stripped. The Quinn Wire & Iron Works tamping machine completed the casting of a single length of pipe in about 2 minutes. At the end of the tamping of the concrete mix right up to the top of the form, a wire reinforcing ring was placed on top and then a header or tamping ring on it, and the ring tamped for about ½ minute.

Finishing and Curing

Immediately after the tamping was completed, the core was pulled out by the tackle and the form and newly cast pipe was wheeled to the curing yard in one of the 2-wheel carts. The forms and pipe were placed at the proper place in the yard, the outer form unclamped and the two halves immediately clamped around a waiting cage and sent back to be cast. The new pipe stood with no outer or inner support other than the reinforcing ring inside the concrete. The pipe at that time was very flexible and for that reason the curing yard where the forms were stripped was paved with concrete and leveled so the pipe would stand perfectly vertical.

The finisher took over at this point and with a soft brush removed the sharp edges of concrete at the tops of the form, patched any slight imperfection at the top and checked the cylinder on two diameters with a gage. When eight new pipes had been lined up, they were covered with canvas which was kept wet for 24 hours. At the end of this initial curing period, the pipes were laid down on their sides, rolled out into the unpaved section of the curing yard and wet constantly for seven days more. After this the pipes were watered three to five times daily, depending on the weather, for a total of ten days, the full curing period. The pipe was then ready for installation. As a slight demonstration of the character of the concrete, the Superintendent took a 5-pound sledge and hit the day-old pipe a goodly tap. It gave off a good ring. But when the 10-day pipe was hit in a similar manner, it rang with almost a metallic sound.

Production

This portable plant operated about 14 hours a day and had a regular production of 448 to 900 feet of 60 down to 12-inch pipe per day. The total production on this job between May 15 and September 12 was as follows:

	For Depot	Outside
12-inch pipe	.....	3,440 feet
18-inch pipe	28,464 feet	898 feet
24-inch pipe	6,960 feet	1,132 feet
30-inch pipe	6,576 feet	2,148 feet
36-inch pipe	2,312 feet	612 feet
42-inch pipe	3,600 feet	308 feet
48-inch pipe	1,728 feet	100 feet
54-inch pipe	1,200 feet	.....
60-inch pipe	1,380 feet	.....
Totals	52,220 feet	8,638 feet

Personnel

This pipe contractor operated under the direction of the U. S. Engineer Department in the production of pipe for this Ordnance Depot.

GET THE JUMP ON BUSINESS

Fast efficient operation is the keynote of today's means of doing business. To get the jump and keep the ball rolling requires not only good judgment but the tools to do the job right. And, when you put a SCHRAMM in the game you will get the outstanding performance that is needed to score on every job. Select the model best adapted for your needs . . . a 20, 60, 85, 105, 210, 315 or 420 cu. ft. capacity.

SCHRAMM INC.
AIR COMPRESSORS
WEST CHESTER, PA.

LIGHT WEIGHT
SELF STARTING
GASOLINE OR DIESEL POWER
COMPACT DIMENSIONS
ECONOMICAL ENGINE SPEED
AUTOMATIC CONTROLS
LONG LIFE
FORCE FEED LUBRICATION
COMPRESSOR EFFICIENCY

SCHRAMM INC. ★ THE COMPRESSOR PEOPLE

Air Bases and Military Highways

"In the past 17 years this 38-V is the very best that I have had," says Harry Pickett, Allegan, Mich., road contractor. His two Pioneer Model 38-V Duplex portable crushing-screening plants are powered with Waukesha Engines.

★ Air bases; runways, taxi strips and aprons for flyingfields; docks; access roads; military highways—are urgently needed for our armed forces everywhere.

And that takes aggregate—tons and tons of it!

To supply it *quickly*, Uncle Sam is getting the current production of these portable Pioneer crushing-screening plants—many of them with Waukesha Super-Duty Power Units.

Contractor Harry Pickett gets real output—100 to 110 cu. yds. of minus ¾" per hr. *consistently* with his portable Pioneer plant. Its Waukesha Oil Engine Power Unit drives the 1036 jaw crusher, 3018 roll crusher, 3′ x 10′ 3½-deck vibrating screen and conveyors smoothly *and* effortlessly—with plenty of power in reserve for emergencies.

In addition to large capacity, the Waukesha Engine, with its moderate weight, gives the plant extra portability.

And by users' performance records, Waukesha Engines give the *greatest overall economy*. Get Bulletin 1079.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS.
NEW YORK • TULSA • LOS ANGELES

Model 6-WAKU Waukesha Super-Duty Industrial Engine

WAUKESHA ENGINES

C. & E. M. Photo
A section of the Pulaski County, Ark., quarry, showing the Schramm 110-foot truck-mounted compressor operating a jackhammer.

Modest County Shop Does Effective Work

(Continued from page 9)

County Equipment

The county operates a ½-yard Insley shovel, a ⅝-yard Speeder, and a ¾-yard Bucyrus-Erie shovel as well as a Universal crane on construction. The crane and the Insley shovel have put in considerable service in the large county quarry where their efforts have speeded the production of stone for county road work. The ¾-yard shovel works in gravel for resurfacing and the Speeder in building grade.

On maintenance operations the county is using two International TD-18 tractors and one D7 tractor with blades and three Caterpillar and one Galion power graders. Two D7 tractors are used to pull 5-yard LaPlant-Choate scrapers on the building of grade. Other equipment operated regularly includes a Schramm truck-mounted 110-foot compressor and a tandem Galion 7-ton roller. In addition there are three Adams power graders, three Caterpillar power graders and one Allis-Chalmers working full time on maintenance.

At the large Park Hill quarry, the site for which was donated to the county by a public-spirited citizen, there are 2 to 4-inch strata of shale between layers of hard blue trap rock. The shale is cleaned out by hand and used for filling holes while the trap is crushed for road construction. The equipment at the quarry includes two Allis-Chalmers gyratory crushers, in addition to which the county owns one Austin 8 x 16 jaw crusher, one 12 x 16 Cedar Rapids jaw crusher, and a Cedar Rapids gravel plant with a 16 x 24 jaw crusher. A Littleford hand-spray asphalt kettle is used effectively for maintenance work and a Farmall tractor with a 7-foot Case power sickle is used constantly for mowing roadsides. For concrete work, when needed, there are two Rex 2-bag mixers with LeRoi engines. All equipment is operated by regular county forces.

The county operates fifteen dump trucks of 1½-ton capacity divided between Fords and Chevrolets. These vary in their services, five operating at the Park Hill quarry and two at the Lawson crushing plant. Three other 1½-ton trucks are used as gang trucks to move prison labor about the county, and another for hauling bridge material and pipe. One International 1½-ton truck is used with a 2-wheel trailer and long stiff coupling to haul long timber and piles.

The County Shop

Housed in a modest building, the county shop is well laid out for effective handling of the usual repairs for construction and maintenance equipment. On the first floor is the repair shop which contains a Smith electric welder; a double power grinder for scythes and the Timken detachable bits used in the quarry; a Champion Blower & Forge Co. drill press; a Little Giant trip hammer; a small bench-type grinder and buffer; a blacksmith shop complete with forge, anvil and a bending block mounted about 2½ feet above the floor for convenience; a heavy-duty vise; a portable Oxweld gas welder; a complete Texaco grease rack; a Kwik-Way valve resurfacer, which is kept covered to protect this precision instrument; a garage compressor driven by a Westinghouse motor, with the air piped along the wall and outside to the grease pit; and a Vapo-Spray outfit for cleaning parts, piped outside so that the water and wastes from cleaning will run to the gutter and drain directly to the city sewer. Further shop equipment includes a Weaver hydraulic press, a Black & Decker electric drill, an Allen tester for regulators and coils, and a large set of hand tools, mostly owned by the mechanics, although the larger ones are bought and maintained by the county. A moderate stock of blades for graders is maintained, with plans to extend the service life of the blades by butt-welding them together to make new blades.

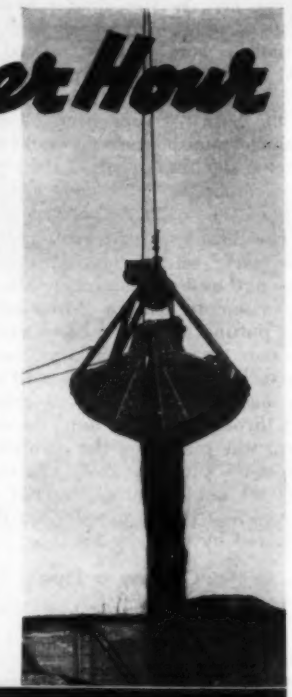
Also on the first floor is a storeroom for tools, nails, handles, brooms, rakes and the like. Back of this is a parts room, locked off from the remainder of the floor, where the many small parts for maintenance work are stored, with a Westinghouse Rectigon battery charger. All parts taken from this room are charged out on requisition to the particular piece of equipment being repaired.

In the basement is a large area at a

(Concluded on next page)

MoreTons per Hour
WITH AN I. B. BUCKET

Properly designed—as a result of over 50 years experience—Industrial Brownhoist buckets are light in weight yet of extra sturdy construction. Large sheaves reduce rope wear and maintenance to a minimum. Deep clean bites practically eliminate hand shoveling. Standard types (rope-reeve, power-wheel, link-type) in stock for immediate delivery. Write for complete information.



INDUSTRIAL BROWNHOIST
BAY CITY, MICH. • DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO

up to 40 TIMES more hole per auger

STOODY TUBE BORIUM
Hardest known metal

Cuts Faster... With Less Power... Reduces Replacements

Stoody Tube Borium is composed of tungsten carbide particles enclosed in mild steel tubes, suitable for application by welding. Because it is the hardest metal ever produced, it easily cuts materials such as granite, shale, concrete, and withstands the severest kind of abrasion. Auger bits when properly tipped with Tube Borium drill as much as 40 times more hole than unprotected augers, and they do it faster without sharpening . . . using less power.

Applications are made with ordinary electric arc or acetylene welding equipment at reasonable cost and with very little effort. Prices of Stoody Tube Borium and methods of application are more fully described in the Stoody bulletin "Tube Borium." Write for free copy!

STOODY COMPANY
1131 WEST SLAUSON • WHITTIER, CALIF.
STOODY COMPANY Hard Facing Alloys

Careful Accounting In Pulaski County

(*Continued from preceding page*)

lower street level where the county stores twelve to fourteen trucks over night. Adjacent to the garage is the office of the Supervisor of Roads and the gasoline dispensing pump. A 10,000-gallon gasoline tank is located near the garage with a 500-gallon tank at the dispensing pump. Purchases of gasoline in bulk are rotated among the various companies serving the area. No gasoline is purchased by individual equipment on the road.

For handling greasing and refueling in the field a pick-up truck is fitted with drums of fuel and lubricants to serve equipment all over the county which cannot pull in for this service.

Accounting

All of the work orders for service performed on any piece of equipment and the requisitions are distributed on a monthly report by number of the machine and operator. This makes it possible to check quickly on poor operation if one operator shows constantly higher repair and fuel costs. Each day the office compiles a report from the work reports of the foremen in the field covering the number of men working, the number of trucks operated, the number of prisoners working, and the number of power shovels, maintainers, rock crushers, and other equipment used. The amount of timber used in bridge construction or repair is shown with the name and location of the structures, together with the amount of lumber remaining in the yard.

The monthly reports summarize these daily reports as well as presenting a check on the quantity of materials in stock for future use.

New Construction

One of the state highways running north from the center of the county is rapidly being threatened by under-cutting of the banks by each succeeding flood. This means that the highway may have to be abandoned by the state at any time. To prevent the loss of service to this section of the county, a new grade is being built by the county about 1 mile back of the present state highway behind the levee. This new Faulkner Lake Road is about 6 miles in length and is being built to state specifications with an 80-foot right-of-way and a 30-foot crown with 6 to 1 slopes and concrete structures. The entire length of the road will be surfaced with 6 inches of crushed stone as soon as grading operations are completed. This road runs through one of the largest cypress swamps in the state and has fills as long as 1,400 feet.

The surfacing of this road will be delayed considerably by the second asphalt freezing order which affected the inland states, as the county was caught flat without any asphalt in stock and with none on the rails.

Personnel

The roads of Pulaski County, Arkansas, are under the care of Harvey Brown, Road Supervisor, with Henry W. Conway as County Engineer, in charge of surveys. The County Judge, who has overall direction of road and other County activities, is C. P. Newton who previously served in this capacity from 1925 through 1928.

New Fix-It Handbook To Keep Shovels at Work

In the preface of its new Emergency Handbook, the Thew Shovel Co. states: "The constantly growing scarcity of raw materials as controlled by Government restrictions and the more strict priority requirements in effect make it more and more difficult for the Thew Shovel Co. to continue to serve you with the kind of repair parts service you have obtained in the past.

"Therefore, to assist our customers in keeping their machines in operation, the following pages offer ideas and hints as to how emergency repairs may be accomplished. It is to be understood, however, that these suggestions are only temporary expedients, but they will keep your machine on the job instead of remaining idle while waiting for an indefinite shipment of new repair parts.

"We feel that the salvaging and conservation of worn or used parts on field machines is a very important contribution to the war effort."

This booklet, with its practical suggestions for meeting all sorts of job emergencies and unfortunate breakdowns, should be in the hands of every Thew-Lorain shovel owner and operator. If you have not already received yours, address your request immediately to the Thew Shovel Co., Lorain, Ohio.

This company is also making available to owners and operators of construction equipment a decalcomania sticker, 6 inches in diameter, bearing the words "Pledged—Construction Equipment Conservation", for attaching to your equipment as a constant reminder of the importance of conservation and salvage to the Victory effort.

There is no better investment in the world than a share in freedom and peace. Buy War Bonds!

INVITING INVENTORS—

Men With New Equipment Ideas—
Plants Needing Extended Facilities—

To Work With Us Now On Plans
For Greater Business After the War

We are a 30-year-old Sheet Metal Fabricating Plant—one of the leading manufacturers of such items as Gasoline Truck Tanks, Gasoline Trailer Transport Tanks, Asphalt Heating & Spraying Equipment for making black top roads, Distributors, Tar Kettles, Street Flushers, Small Maintenance Rollers, etc.

We have for many years built a wide variety of products of aluminum, stainless steel, Hi-Tensile steel, blue annealed steel. We have a large engineering force and a sizable department devoted solely to research. Our plant is modern, well equipped, and manned by skilled workers who have been with us for many years.

Our experience, skill and facilities are at the present time devoted 97% to war production work on vital equipment for U. S. Army Air Forces, Marine Corps, U. S. Engineers, and other War agencies. To deliver the volume of the materials required of us we have recently expanded our facilities, both in buildings and equipment. Consequently, we will be in a position to considerably expand our present lines of manufacture after the war. In preparation for this we are working on ideas for getting into entirely new industries and new markets.

YOU may have ideas for new equipment. If you have such ideas our Research Department will gladly discuss them with you and help you develop them if they prove practical.

YOU may be operating a plant making a product which could be built more economically in our plants and sold in greater volume.

Final arrangements may result in your coming into our company—or a proposition might be worked out on a royalty or some other desirable basis.

If you feel you have something on which we could work together, please communicate with us, giving us full particulars. We can then arrange for a meeting if the ideas are adaptable to our plant and facilities, or adaptable to facilities which we might wish to add to carry out this idea.

STANDARD STEEL WORKS North Kansas City, Missouri, U.S.A.

RITECURE
for all Concrete Construction

The RITECURE Film with 60% Solids gives Wide Coverage and Perfect Curing

FILM or membranous curing of concrete structures is simple and economical. For vertical surfaces it provides about the only practical way of curing at all.

But the film to be fully effective must be impervious over its entire surface and stay that way throughout the critical curing period. Obviously the amount and character of solids remaining after the carrier has evaporated are important.

RITECURE contains 60% solids. It dries into a thin but tough, durable film with considerable elasticity. Its spreading qualities assure full coverage without the need of excess amounts. More than 2,000,000 square yards of concrete a month are being cured with RITECURE.

Buy solids—not solvents.

RITECURE

A Transparent Membrane for Curing Concrete

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CURING MATERIALS CO. 2130 Jane Street • Pittsburgh, Pa.

a product of: THE JOHNSON-MARCH CORPORATION, 52 Vanderbilt Ave., New York, N. Y.

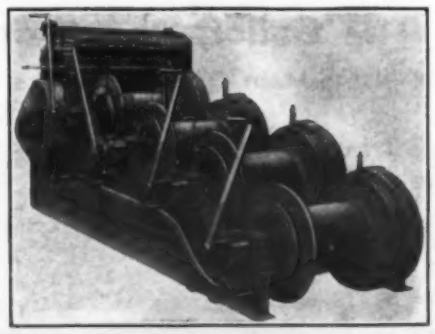
HOIST
Information Please

NOVO HOISTS TO DO CRANE, DOZER AND TRACTOR WORK

Did you know that a Novo Hoist could be arranged to do a lot of the jobs that higher priced, more critical equipment, have previously performed?

CRANE WORK—A Novo Hoist can be used very successfully on such work as steel erection, pile driving, clam shell bucket work, etc.

DOZER AND TRACTOR WORK—Novo Dragline Hoists can be used for dozer and tractor work handling dirt on cuts, fills and grades. You may be familiar with these applications, if not write for complete information on how to substitute hoists for hard to get Cranes, Dozers and Tractors.



NOVO ENGINE COMPANY LANSING, MICHIGAN

NOVO ENGINE CO., 216 PORTER ST., LANSING, MICH.
SEND INFORMATION ON NOVO HOISTS
TYPE OF WORK ..... SIZE .....
NAME .....
ADDRESS .....

One of the Littleford torches for heating a concrete mixer in order to keep concreting jobs going during the winter months.

Airport Equipment Gets Regular Greasing

(*Continued from page 47*)

plants scattered over the line of haul and on the major fill operations.

The contractors' lubrication problem was large with so great an array of dirt-moving equipment working right around the clock. To provide the necessary greasing and oil-checking facilities without taking any one piece of equipment off the job for longer than necessary, there were a total of eight grease and oil trucks on the job. They worked like beavers on the change of shift and at meal times to insure the greatest number of grease jobs completed when the equipment was stopped, then they put in equal speed to finish each piece when it was picked off the line so that production would not be reduced. Knowing full well that a "shot of the right grease in time saves hours in the repair lines", every man in the greasing outfit put all he had into speed and complete service to the equipment he was working on. Most of the grease trucks were assembled by the contractors but there were two Lincoln fleet lubrication outfits included in the even dozen of trucks devoted to "keeping 'em rolling".

One of the dairy buildings with tile walls and finished concrete floors was taken over for a lubrication storage shed. The immaculate floors were soon stained with spilled grease and typical construction litter. One of the contractors used Sinclair lubricants throughout on his equipment while the other maintained a separate storage and repair shop at another part of the job where his lubricants were stored and dispensed.

Major Quantities

The major quantities involved in this great airport project in which a dairy farm, woodland and cultivated fields were converted into a well-graded airport in 240 days, were:

Clearing and grubbing wooded areas	47 acres
Unclassified excavation	4,085,000 cubic yards
Coal excavation	300,000 cubic yards
Special excavation	3,800 cubic yards
Special rock excavation	1,450 cubic yards
Rolling, for each additional three trips, 100 sq.-ft. units	240,000 squares
Gravel drains	2,420 cubic yards
Concrete for culvert	6,200 cubic yards

Personnel

This new CAA airport in eastern United States was constructed by contract under the direction of the U. S. Engineer Department at an estimated cost of $2,447,343.00. The contract called for completion of grading within 240 calendar days. The contractors started June 4, 1942, and completed in November, 1942.

In the interest of national security, the location of and mention of personnel connected with U. S. Army construction are omitted.

Questions and Answers On Wage Stabilization

A manual for employers, personnel directors and labor relations men on how to apply the new Wage Stabilization Act has just been released by the Labor Relations Institute. This handbook, "Practical Questions and Answers on Wage Stabilization", is the second in a series of labor relations publications resulting from surveys on current employer-employee problems conducted by the Institute's field staff.

The current report is a compilation of the wage stabilization questions which are proving most troublesome to management executives. Details of the kind of raises which may be given as well as the types of increases which have been disallowed by the new orders are included. There are also suggestions for record-keeping forms to help prevent unintentional violations of the complex War Labor Board and Treasury orders, and the names and addresses of Regional Directors of the WLB and the functions of the recently appointed tripartite panels.

Copies of this handbook on Wage Stabilization may be secured without charge direct from Lawrence Stessin, Director, Industrial Division, Labor Relations Institute, 1775 Broadway, New York City.

Lubricant Costs Cut With Less Time Out

The story of the operation of tractors and scrapers in wet clay with unusual speed and savings and less time out for repairs is told in a folder recently issued by Swan-Finch Oil Corp., 201 North Wells St., Chicago, Ill.

Swan-Finch lubricants are produced especially for tractors, trucks, automobiles, scrapers and shovels for contractors and highway department officials who, if they will send a list of types of equipment they own, will be furnished with recommendations for the lubrication of those specific machines. Send your requests direct to Swan-Finch and mention this item.

WILSTA-FORM-XTERNAL

WILLIAMS

"SUPER-HI"

TENSILE TIE RODS

INEXPENSIVE U. S. STANDARD THREAD RODS

¾" long thread, each end ½" diam. U. S.—20 thread. 6,000 lbs. Ultimate Tensile 4,800 lbs. Working Load per Rod			¾" long thread, each end ⅝" diam. U. S.—16 thread. 9,500 lbs. Ultimate Tensile 7,500 lbs. Working Load per Rod			¾" long thread, each end ½" diam. U. S.—13 thread. 16,500 lbs. Ultimate Tensile 13,000 lbs. Working Load per Rod		
LENGTH of Rod	Price per 100 Rods	App. Wall Width	LENGTH of Rod	Price per 100 Rods	App. Wall Width	LENGTH of Rod	Price per 100 Rods	App. Wall Width
12" or less	$2.00	15" or less	12" or less	$3.00*	15" or less	12" or less	$4.00*	15" or less
13"	2.17	16"	13"	3.25	16"	13"	4.33	16"
14"	2.33	17"	14"	3.50	17"	14"	4.67	17"
15"	2.50	18"	15"	3.75	18"	15"	5.00	18"
16"	2.67	19"	16"	4.00	19"	16"	5.43	19"
17"	2.83	20"	17"	4.25	20"	17"	5.67	20"
18"	3.00	21"	18"	4.50	21"	18"	6.00	21"
19"	3.17	22"	19"	4.75	22"	19"	6.33	22"
20"	3.33	23"	20"	5.00	23"	20"	6.67	23"
21"	3.50	24"	21"	5.25	24"	21"	7.00	24"
22"	3.67	25"	22"	5.50	25"	22"	7.33	25"
23"	3.83	26"	23"	5.75	26"	23"	7.67	26"
24"	4.00	27"	24"	6.00	27"	24"	8.00	27"
Price per add'l inch	$.0015	Figure rods from 2" to 5" less than Wall for Vibra-Lock or nearest 3" multiple	Price per add'l inch	$.0023	Figure rods from 2" to 5" less than Wall for Vibra-Lock or nearest 3" multiple	Price per add'l inch	$.0031	Figure rods from 2" to 5" less than Wall for Vibra-Lock or nearest 3" multiple
Price per add'l foot	$.018		Price per add'l foot	$.0276		Price per add'l foot	$.0372	
Price per add'l 100 ft.	$1.80		Price per add'l 100 ft.	$2.76		Price per add'l 100 ft.	$3.72	
Lengths over 20'0" add for Williams High Tensile Couplings per 100	$2.75		Lengths over 20'0" add for Williams High Tensile Couplings per 100	$3.75		Lengths over 20'0" add for Williams High Tensile Couplings per 100	$4.75	

* Rods under 12" in length knurled to prevent turning in concrete.

Immediate 24-Hour Service — PHONE 3-3823 Day or Night

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Use Williams Form Clamps for Best Results

Williams Vibra-Lock—for Dams, Bridges, Heavy Construction, Battered Walls, etc. Williams Simplex—for Commercial Buildings, Sewage Disposals, Filtration Plants, Architectural Concrete, etc.

(Freight allowed anywhere in U. S. on order of 100 sets or more at list.)

Send us your plans: We figure the ties, showing locations, etc.

Williams Form Engineering Corp., 46 East Hall St., Grand Rapids, Mich.

MALL 1½ H. P. Gasoline-Powered VIBRATOR

On airport runway, industrial plant, defense housing, pier, dock, dam, tunnel, bridge and other War Construction MALL Gasoline Powered Vibrators are daily placing large volumes of low-water-cement-ratio concrete faster and better with less power, less fuel, less water, sand and cement.

MALL vibrated concrete is stronger and better. It has greater water tightness. It is free from honeycombs and voids, thus eliminating expensive hand patching. It assures a firmer bond with reinforcement and permits an earlier stripping of forms.

MALL 1½ H. P. Gasoline-Powered Vibrators can be operated anywhere without a generator or compressor set and are easily carried by one man. The variable speed gasoline engine starts easily in cold weather, runs by itself, and supplies ample power for the 8 quickly interchangeable attachments for Concrete Vibrating, Concrete Surfacing, Form Sanding, Wire Brushing, Sharpening tools, Drilling, Sawing with circular saw and Pumping.

Other gasoline engine, air and electrically driven units 1½ H.P. to 3 H.P. are available for Victory Construction. Full details upon request.

MALL TOOL COMPANY

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Offices and Distributors in Principal Cities

GALION HAS GONE TO WAR

The Galion Iron Works & Mfg. Co.

Main Office & Works: Galion, Ohio

Everything is sort of upside down today with the war and all . . but we're going to straighten it out. Galion is in there pitching . . will be when it is over. So don't forget Galion rollers, graders and spreaders.

Roster of Equipment For District 10, N. Y.

(*Continued from page 33*)

...c Works, includes the following:

- 7-ton Buffalo-Springfield roller
- 5-ton Acme roller
- 6-8-ton Galion portable roller
- 10-ton Austin-Western roller
- 2½-ton Galion roller
- Rome graders with McCormick-Deering engines
- Warco graders with J. I. Case engines
- Portable Machinery Co. conveyor with 10-hp Le Roi engine
- Ingersoll-Rand portable air compressors with Waukesha motors
- Metalweld portable air compressor with Continental engine
- Worthington air compressors with Hercules engines
- ¼-yard Jaeger concrete mixer
- H. Brewer & Co. 10-cubic foot concrete mixer with Le Roi engine
- 10-S Ransome concrete mixers with Le Roi engines
- 5-cubic foot Wonder Mixers with Le Roi engines
- DeVilbiss traffic-line markers with Novo engines
- Lewis Mfg. Co. traffic-line marker with Johnson engine
- traffic-line markers with Johnson engines
- Koehring Mud-Jacks with Buda engines
- Domestic 6-inch trench pumps with Le Roi engines
- Hough rotary sweeper with Le Roi engine
- Acker Drill Co. core drill with Le Roi engine
- McCormick-Deering tractor mowers
- Centaur tractor mowers with Le Roi engines
- Jaeger 2-inch centrifugal pumps with Wisconsin motors
- Gorman-Rupp 2-inch centrifugal pumps with Wisconsin motors
- Barnes 4-inch centrifugal pumps with Hercules motors
- Tarrant bituminous spreader with Briggs & Stratton motor
- Friend Mfg. Co. tree sprayer with Le Roi engine
- 2½-ton Brockway trucks
- Ford 1½-ton trucks
- Dodge 1½-ton truck
- 1½-ton Autocar truck
- 1½-ton Chevrolet truck
- ½-ton Chevrolet pick-up trucks
- ½-ton Ford pick-up truck
- 3-ton International stake-body truck

Personnel

District 10, with headquarters at ...abylon, usually employs about 200 ...en in the engineering force, but this ...as been greatly reduced due to the ...umber of men who are on leave of ab...ence in Federal service and in engineer...ng work on war projects. J. J. Darcy is ...istrict Engineer, with A. D. Greenman ...n charge of construction and main...enance. J. Herzy is Foreman of motor ...quipment maintenance.

Indiana Makes Survey Of Street, Road Work

The State Highway Commission of ...ndiana, acting as an agent for the War ...roduction Board, is collecting data on ...he street and highway construction pro...rams of Indiana cities, towns and coun...ies for the coming year, it is reported ...y S. C. Hadden, Chairman. The survey ...s to determine the extent of street and ...oad construction planned and the quantities of critical materials which would be required in such construction. Listed as critical materials are steel, common and structural lumber, and cement which is a new addition to the list. In this survey the proposed use of bituminous materials is not included, as a separate report on this type of work is to be made later.

Mr. Hadden pointed out that, in collecting this information from cities, towns and counties, the State Highway Commission is merely carrying out a request by the WPB and that the Commission does not in any way pass on the merit of any such construction projects which are being proposed.

Both cities and counties, like the State Highway Commission, are subject to the new regulation on street and highway construction which restricts projects to those for which approval is given by the Public Roads Administration and the WPB reviewing agency as formerly required and on which now the state, county or city can guarantee that a contractor will bid, that the contractor has adequate equipment in good condition, and that adequate labor is available in the area where the work is to be done.

This regulation means a further reduction in the volume of street and road work to be done by cities, counties and the state during the coming year.

Carey Elastite EXPANSION JOINT
Standard in Concrete Construction for 31 Years
ECONOMICAL and EFFICIENT
Asphalt Joint
Fiber Joint
Sub-Grade Felt
THE PHILIP CAREY MFG. CO.
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO

WILLIAMS Buckets
ARE BITING INTO FROZEN GROUND and TROPIC MUCK

● Williams Buckets are very much in active service in the wide-flung war offense. Concrete-hard, frozen ground is being broken by the sharp teeth of Williams Buckets in far north road building. Deep in jungles Wellman Buckets are digging and dredging. At ore mines, over stock piles and railway cars, and in steel mills Williams Buckets are literally moving mountains to help beat the Axis.

built by
THE WELLMAN ENGINEERING COMPANY
7012 Central Avenue • Cleveland, Ohio

20 Years In CONCRETE

For over 20 years Garlinghouse Brothers have furnished concrete handling equipment to the constructors of the West. GAR-BRO products are used on the smallest jobs to the building of the largest Cantonments, Airports and Dams.

After the Project is completed *GAR-BRO Products* remain on the job as *Maintenance Equipment.*

Skillful design and welded steel construction give strength for years of useful service.

Write for catalogs.

EQUIPMENT GAR-BRO ENGINEERING SERVICE

CONCRETE PLACING EQUIPMENT
Concrete
Buckets
Batchers
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INDUSTRIAL EQUIPMENT
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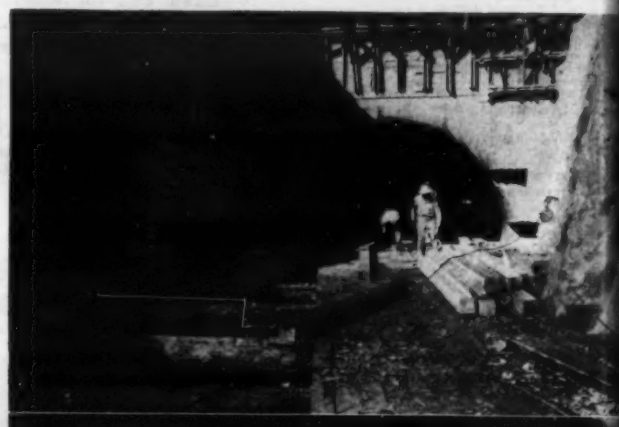
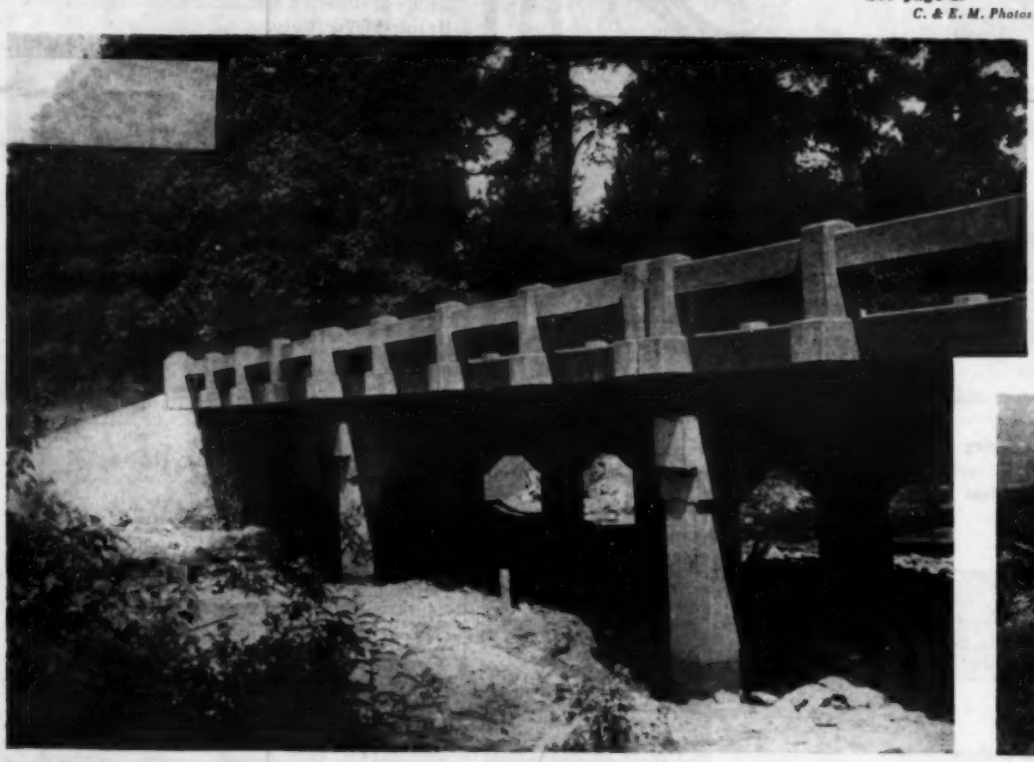
U. S. E. D. Photos

Above, placing and rolling fill on the NW-SE runway at an airport built on the site of a dairy farm. Note the portable lighting equipment for night work. At left, completed section and reinforcing for a 12 x 12-foot arched culvert under an eastern-airport runway where the maximum fill of 95 feet will cover the culvert. See page 26.



At right, building the timber truck ramp to the diversion tunnel of Anderson Ranch Dam for removal of excavation from the new inclined section of the tunnel. Bottom photo, a closeup of the ramp. See page 2.

C. & E. M. Photos



C. & E. M. Photo

A 100-foot concrete and I-beam bridge with an 18-foot roadway, built before steel became a critical material, in Pulaski County, Ark. The work of the County Highway Department is described in this issue. See page 9.

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Buy War Bonds

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Missouri's methods of corrective and preventive maintenance of concrete roads by Mud-Jacking a slurry under the pavement is described in detail in this issue. At right is a complete slurry-pumping outfit correcting subgrade inequalities to prevent further cracking of a concrete pavement. See page 22.

C. & E. M. Photo

C. & E. M. Photo

A Bucyrus-Erie 10-B shovel loading w pit-run gravel for road base at a moun Ordnance Depot. See page 8.